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CANDIDATE NAME: StemUp Model Solution

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6006212666

PSYCHOLOGY **9990/11**

Paper 1 Approaches, Issues and Debates **October/November 2025**

1 hour 30 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
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- Do **not** write on any bar codes.

INFORMATION

- The total mark for this paper is 60.
- The number of marks for each question or part question is shown in brackets [ ].

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Section A

Answer **all** questions.

1 In the study by Hassett et al. (monkey toy preferences), an example of a toy in the 'wheeled' category was a car.

(a) Identify **one** other toy that was in the 'wheeled' category.

A wagon. [1]

(b) Outline what was meant by the behaviour 'drag' as used in this study.

Drag meant the monkey moved the toy along the ground with the toy behind the monkey, pulling it along as the monkey walked. [2]

(c) Outline what is meant by the term 'socialisation'.

Socialisation is the process by which a person's behaviour is changed and shaped, for example through reinforcement from parents and peers, so that they learn the behaviours their society or culture expects as typical and acceptable, such as gender roles. [2]

2 From the study by Milgram (obedience):

(a) One conclusion from the study was that when a person's responsibility is taken from them, they are willing to harm someone else.

Outline **one** other conclusion from this study.

Individuals are much more obedient to an authority figure than we would expect; people will follow the orders of a person in authority even if it means harming another person, although they find obeying such destructive orders very stressful. [2]

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(b) Explain **one** strength of this study.

The procedure was standardised, so it could be replicated to test its reliability. For example, every participant received the same 45 V sample shock, and the experimenter used the same four prods in the same order.

..... [2]

3 From the study by Fagen et al. (elephant learning):

(a) The 'capture technique' was used in the training of the elephants.

Outline what is meant by the 'capture technique' as used in this study.

The trainer waits for the elephant to perform the target behaviour spontaneously (naturally), then marks and rewards it each time so that it is repeated. For example, the "blow" behaviour was captured from an elephant's natural exhale.

..... [2]

(b) Outline **one** result about the mean success rate for the 'trunk wash' task over time.

There was a general trend that the more training sessions the elephants had, the higher the mean percentage of successful trunk washes, although there was a dip in the success rate between about sessions 25 and 30.

..... [2]

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4 From the study by Perry et al. (personal space):

Describe the procedure of **one** trial for Experiment 1 from when the fixation point appeared until the end of the trial.

A still picture appeared of a circular room, with a figure standing at the centre of the room and an approaching figure (for example a friend, a stranger, an authority figure or a ball) at one of eight entrances around the edge. The participant was asked to imagine that they were the figure at the centre. Then a 3 second animation showed the figure approaching the centre. The participant pressed the spacebar when they wanted the figure to stop, or the trial ended when the figure collided with the "participant" at the centre.

..... [4]

5 From the study by Baron-Cohen et al. (eyes test):

(a) The Group 1 sample consisted of 15 participants who were all male.

Identify **two** other features of the Group 1 sample.

1 *They were adults, with a mean age of 29.7 years.*

2 *They had been diagnosed with Asperger syndrome or HFA.*

[2]

(b) Explain **one** strength of the revised eyes test.

The test produces quantitative data (a score out of 36), so it is easy to compare. This means that the scores of adults diagnosed with AS/HFA can be compared with those of the control groups to detect a deficit in theory of mind.

..... [2]

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6 **(a)** In the background to their study, Pozzulo et al. (line-ups) outlined the role of social factors in identification errors made by children.

Outline the role of social factors in these errors.

Children may see the adult experimenter or police officer showing the line-up as an authority figure, which can make them feel nervous or intimidated. The mere presentation of a line-up by an adult may make the child feel that a choice has to be made, and they may want to please the adult, so they pick someone even when the culprit is absent. Saying "not there" might seem like refusing to take part, so it is social pressure, rather than poor memory, that leads to the wrong choice. [3]

(b) Two friends, Doris and Tony, are discussing the ethics of the study by Pozzulo et al. (line-ups).

Doris says the study is ethical, but Tony says it is **not** ethical.

Outline why you think **either** Doris **or** Tony is correct, using evidence from the study.

The friend who I think is correct is *Doris*

because: *Consent for the children was given by a parent or guardian, who also completed the Demographic and Cartoon Watching Form, and the adults gave their own consent. The task of looking at a line-up of cartoon faces and pointing to one is not stressful, so there was no risk of physical or psychological harm. Also, the children were already familiar with Dora and Diego from watching the cartoons, so seeing these faces among other similar cartoon characters would not be distressing for them.*

[4]

7 The debate about individual and situational explanations relates to the study by Piliavin et al. (subway Samaritans).

Outline what is meant by this debate, including **one** example from the individual explanation and **one** example from the situational explanation, each from the study by Piliavin et al.

The debate is whether behaviour is caused by individual (dispositional) factors within the person, such as their personality, or by situational factors in the external environment, such as the setting or other people. Individual: some passengers left the critical area after the victim collapsed, possibly because they had a personality that is less inclined to help. Situational: the ill victim (carrying a cane) was helped more often than the drunk victim, perhaps because the drunk victim seemed to have caused their own situation.

..... [4]

8 Your friend, Pavel, is complaining that he cannot relax. He tells you that his job is stressful. He has come to you for advice on how to relax.

Using your knowledge of the study by Hölzel et al. (mindfulness and brain scans):

(a) Outline the advice you would give to Pavel.

Pavel should join an 8-week MBSR (mindfulness-based stress reduction) course with a weekly group class. In it he should practise a body scan, lying down and becoming fully aware of the sensations in each part of his body in turn, and mindful yoga, doing slow stretching movements in time with his breathing. In sitting meditation he should mentally note when he feels stress and "observe" where the stressful stimuli come from. He should practise at home or at work for about 45 minutes every day.

..... [4]

(b) Explain **one** reason for **one** piece of advice you outlined in part **(a)**.

Hölzel found that after the MBSR course participants had increased grey matter in brain areas involved in regulating emotion, such as the left hippocampus, and higher "observing" scores. So daily practice should help Pavel notice and control his stress at work, and relax. ..... [2]

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Section B

Answer **all** questions.

9 **(a)** From the study by Dement and Kleitman (sleep and dreams):

Describe how the EEG (electroencephalogram) was used in this study.

Electrodes were placed on the participant's scalp to record brain waves, and next to the eyes to record eye movements. All the electrode lead wires were gathered at the top of the head into a single cord, so the participant could move freely in bed without the wires tangling. The EEG ran continuously all night, with the paper moving at 3 or 6 mm per second so that eye movements were easy to recognise. This let the researcher identify whether the participant was in REM or NREM sleep and wake them at specific times with a doorbell. It also showed the direction of the eye movements during dreaming. [4]

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(b) Explain **two** similarities between the study by Dement and Kleitman (sleep and dreams) and **one** other study from the biological approach. Do **not** refer to brain measurement techniques.

1 *Both studies collected quantitative data, which allowed direct comparisons between conditions or groups. In Dement and Kleitman, the number of times dreams were recalled when woken in REM sleep and in NREM sleep was recorded and compared, showing much more dream recall in REM sleep. In Hassett et al., the frequency and duration of each monkey's play with wheeled and plush toys were recorded, so the toy preferences of male and female monkeys could be compared. So in both studies the data was objective and easy to analyse statistically.*

2 *Both studies used small samples that are not very representative, which makes it hard to generalise the findings. Dement and Kleitman studied only nine adults (seven men and two women), so their dream recall may not reflect everyone's sleep. Hassett et al. analysed data from only 34 rhesus monkeys, all from one troop at the Yerkes Center, so their toy preferences may not apply to monkeys reared in different social groups, or to human children. Therefore in both studies we must be cautious when generalising the conclusions.*

[8]

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10 Evaluate the study by Bandura et al. (aggression) in terms of **two** strengths and **two** weaknesses. At least one of your evaluation points **must** be about ethics.

One strength is that Bandura used a highly standardised procedure, so the study can be replicated to test its reliability. Every child was taken to the same room, watched the model for about 10 minutes, was then mildly frustrated by having attractive toys taken away, and was finally observed for 20 minutes in a room with the same aggressive and non-aggressive toys, including a 3 foot Bobo doll and a mallet. The aggressive models performed the same specific acts, such as sitting on Bobo and punching it on the nose and saying "Pow". So any differences in imitation are due to the independent variables and not to changes in the procedure.

A second strength is the quantitative data. Observers recorded the child's behaviour every 5 seconds through a one-way mirror, counting imitative physical and verbal aggression. This made it easy to compare aggressive and non-aggressive models, and male and female models, directly. A second observer also scored some of the children, giving high inter-rater reliability.

However, a weakness is ethics. The children were exposed to an adult beating up a Bobo doll and were deliberately frustrated, so they may have been psychologically harmed or distressed, and they may have learned aggressive behaviours that lasted after the study. They were too young to give their own consent or understand that they could withdraw.

Another weakness is low ecological validity. The children watched a stranger in an unfamiliar room and then played with a Bobo doll, which is designed to be hit, so this may not show how they would copy aggression towards real people in everyday life. Also, all 72 children came from one Stanford University nursery, so the findings may not generalise to other children.

Overall, the standardised procedure and quantitative data make the findings reliable, but the ethical issues and artificial setting limit how far they can be applied to real aggression.

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Cambridge Assessment International Education

Cambridge International AS & A Level

CANDIDATE NAME: StemUp Model Solution

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PSYCHOLOGY **9990/12**

Paper 1 Approaches, Issues and Debates **October/November 2025**

1 hour 30 minutes

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Section A

Answer **all** questions.

1 From the study by Milgram (obedience):

(a) State the number of participants who pressed the maximum shock level switch (450 volts).

26 participants (65%). [1]

(b) One example of a sign of tension shown by the participants in this study was nervous laughter.

Identify **two** other signs of tension shown by the participants.

1 *Sweating.*

2 *Trembling.*

[2]

(c) Before the study, fourteen psychology students from Yale University were told about the procedure of the study.

Outline what these students were asked to predict about the study.

They were asked to reflect carefully on the procedure and predict the behaviour of 100 hypothetical people, plotting the distribution of obedience, so predicting what percentage of participants would go all the way to the 450 V switch. [2]

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2 From the study by Bandura et al. (aggression):

(a) One conclusion was that boys are more likely to imitate aggressive behaviour than girls.

Outline **one** other conclusion from this study.

Witnessing an aggressive act by an adult model is enough to produce aggression in the child who observed it, and children will reproduce this aggression even when the model is no longer present.

..... [2]

(b) Outline **one** weakness of this study in relation to the sample of participants.

It is difficult to generalise from the sample. All 72 children came from one nursery at Stanford University, so they may not represent children from other nurseries, backgrounds or cultures.

..... [2]

3 In the study by Piliavin et al. (subway Samaritans), there were:
- models
- victims (acting drunk or acting ill).

(a) Identify **two** features of the models used in this study.

1 *They were white males.*

.....

2 *They were aged 24 to 29 and wore informal clothes.*

.....

[2]

(b) Outline **one** result in relation to the victim acting drunk before any model gave help.

Before any model helped, a white drunk victim was helped more often than a black drunk victim, so same-race helping was more common. Overall the drunk victim received spontaneous help on 19 out of 38 trials.

..... [2]

4 Describe how Hassett et al. followed ethical guidelines in relation to animals in their study about monkey toy preferences.

They followed the guideline on housing: the monkeys were socially housed in their natal troop, because rhesus monkeys are a social species, with a 25 m × 25 m outdoor enclosure and a temperature-controlled indoor area. There was no deprivation, as water was continuously available and they were fed a regular, appropriate diet. Harm and distress were minimised; the toys chosen were not dangerous, the monkeys were tested in their familiar home enclosure, and they were filmed by video cameras rather than observed directly.

..... [4]

5 From the study by Hölzel et al. (mindfulness and brain scans):

(a) 'Acting with awareness' was a factor measured by the 'Five Facet Mindfulness Questionnaire'.

Outline what is meant by 'acting with awareness' in this study.

Acting with awareness means consciously focusing on what you are doing in the present moment, rather than behaving automatically (on "autopilot") without paying attention to your actions.

..... [2]

(b) Outline **one** strength of the Five Facet Mindfulness Questionnaire as used in this study.

The FFMQ generated quantitative data, so the scores could be compared statistically before and after the 8-week MBSR course, and with the control group, to see the effect of the programme on mindfulness.

..... [2]

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6 **(a)** In the background to their study, Perry et al. outlined how biological factors affect interpersonal distance (personal space) preferences.

Outline how biological factors affect interpersonal distance (personal space) preferences.

Oxytocin may play a role in personal space, as it affects social bonding and how socially salient other people are. Patients with lesions in the amygdala appear to have a reduced need for personal space, and in healthy people amygdala activity is correlated with feeling uncomfortable when others are very close. Amygdala activation is itself affected by levels of oxytocin, and oxytocin can also change the distance kept from someone perceived as attractive. [3]

(b) Two friends, Alexandre and Derek are discussing the ethics of the study by Perry et al. (personal space).

Alexandre says the study is ethical, but Derek says it is **not** ethical.

Outline **one** reason why Alexandre is correct and **one** reason why Derek is correct.

Alexandre *Written informed consent was obtained from the participants, who knew the study was about personal space and that they would be given oxytocin or a placebo. The study was also approved by the university ethics committee.*

Derek *There was a risk of physical harm, because there was no way of knowing in advance how each participant would react to the oxytocin nasal spray. Also, having a figure intrude into your personal space, even in an animation, could be stressful.*

[4]

7 The debate about individual and situational explanations relates to the study by Dement and Kleitman (sleep and dreams).

Outline what is meant by this debate, including **one** example from the individual explanation and **one** example from the situational explanation from the study by Dement and Kleitman.

The debate is whether behaviour is caused by individual (dispositional) factors within the person, such as their personality or biology, or by situational factors in the external environment, such as the setting. Individual: the content of each dream was unique to the dreamer, for example one dream involved throwing tomatoes at someone, reflecting that person's own personality and experiences. Situational: participants slept in an unfamiliar sleep laboratory with electrodes attached and were woken by a doorbell, and this setting may have affected their sleep and their ability to recall dreams.

..... [4]

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8 Carole, a language teacher, has noticed that her students have difficulty concentrating when listening to a recording of people talking in a second language. Her students have difficulty recalling the information from this recording. Carole needs to help her students and has come to you for advice.

Using your knowledge of the study by Andrade (doodling):

(a) Outline the advice you would give to Carole.

Carole should give each student an A4 sheet printed with alternating rows of squares and circles, and ask them to shade in the shapes while they listen to the recording. The sheet should have a wide margin down the side for writing down the target information. She should tell them not to worry about how neatly they shade, and not to draw their own free doodles. She should tell them in advance which specific information to listen for and that there will be a test afterwards, and play the recording in a quiet room.

..... [4]

(b) Explain **one** reason for **one** piece of advice you outlined in part **(a)**.

In Andrade's study, participants who shaded shapes while listening to a dull telephone message recalled more information than those who did not doodle. This is because doodling stops daydreaming, so it improves concentration, which helps memory recall.

..... [2]

Section B

Answer **all** questions.

9 From the study by Saavedra and Silverman (button phobia):

(a) Describe the participant used in this study.

The participant was one 9-year-old Hispanic-American boy. His mother brought him to a Child Anxiety and Phobia Program. His phobia had started when he was 5, about four years before the study, when a bowl of buttons fell on him at school while he was reaching for one. He met the DSM-IV criteria for a specific phobia but did not meet the criteria for OCD. His phobia was based mainly on disgust rather than fear.

..... [4]

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(b) Explain **one** similarity and **one** difference between the study by Saavedra and Silverman (button phobia) and the study by Bandura et al. (aggression). Do **not** refer to sampling in your answer.

Similarity *Both studies collected quantitative data, which allows objective comparisons. In Saavedra and Silverman, the boy rated his distress about different buttons on a Feelings Thermometer (0 to 8) across the therapy sessions, so changes in his disgust could be compared over time. In Bandura et al., observers counted the number of imitative physical and verbal aggressive acts each child made, so aggressive and non-aggressive model conditions could be compared. So in both studies the effect of the learning could be measured numerically.*

Difference *The studies focus on different theories from the learning approach. Bandura focused on social learning, where children learned aggression vicariously by observing and imitating an adult model. Saavedra and Silverman focused on classical and operant conditioning: the boy's phobia was learned through a direct experience of buttons falling on him, and during the treatment he was rewarded with praise by his mother. So Bandura is about vicarious learning, whereas Saavedra is about direct "hands-on" experience.*

[8]

10 Evaluate the study by Pozzulo et al. (line-ups) in terms of **two** strengths and **two** weaknesses. At least one of your evaluation points **must** be about ecological validity.

One strength is that the procedure was standardised, so it could be replicated to test reliability. Every participant was given the same line-up identification instructions, and the cartoon targets were always Dora and Diego, with foils chosen systematically: three judges rated ten internet images for similarity to each target and the four most similar were used. So any difference between children and adults is likely to be due to age, not changes in the procedure.

A second strength is the quantitative data. The number of correct identifications, false identifications and correct rejections was recorded for target-present and target-absent line-ups. This made it easy to compare children with adults objectively, showing that children were as accurate as adults when the target was present, but made more errors when it was absent.

However, a weakness is low ecological validity. Participants identified familiar cartoon characters from black and white, cropped pictures, rather than a real person they had seen commit a crime. In real life a child witness may be frightened, may have seen the culprit only briefly and may be questioned by a police officer, so their identifications could be less accurate than in the study.

Another weakness is the sample. The adults came from a participant pool at a university in Eastern Ontario, Canada, and the children from local (pre)kindergartens, so they may not represent people from other cultures and may have been more motivated to take part.

Overall, the standardised procedure and quantitative data make the study reliable, but its artificial cartoon task means we should be cautious about applying the findings to real line-ups.

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Cambridge Assessment International Education

Cambridge International AS & A Level

CANDIDATE NAME: StemUp Model Solution

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PSYCHOLOGY **9990/13**

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Section A

Answer **all** questions.

1 From the study by Andrade (doodling):

(a) Outline how the participants were recruited in this study.

They were members of a participant panel who had just finished an unrelated experiment, and were asked if they would spend another 5 minutes helping with another study (an opportunity sample).

..... [2]

(b) Identify **two** features of the piece of paper given to the participants in the doodling condition.

1 *Alternating rows of squares and circles.*

.....

2 *A margin down the side for writing the target information.*

.....

[2]

(c) Identify how recall of incidental information was measured.

By the number of places they correctly recalled. [1]

2 From the study by Piliavin et al. (subway Samaritans):

(a) One conclusion was that, in a natural setting, people do offer spontaneous help to a victim in need.

Outline **one** other conclusion from this study.

A person who appears ill is more likely to receive help than a person who appears drunk, probably because the costs of helping a drunk victim seem higher and the rewards lower.

..... [2]

(b) Outline **one** ethical weakness of this study.

Participants were deceived, as they did not know the victim was only acting ill or drunk. They also could not give consent or be debriefed, so they never knew they had been in a study.

..... [2]

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3 The study by Hassett et al. (monkey toy preferences) used a sample of male and female monkeys.

(a) Identify **two** features of the sample used in this study, other than sex and species.

1 *They lived in a troop of 135 monkeys at the Yerkes Center.*

2 *The troop had lived together for more than 25 years.*

[2]

(b) Describe **one** result for the toy preferences of female monkeys in this study.

Female monkeys showed only a slight preference; they played with plush toys for only slightly longer (in duration) than with wheeled toys.

[2]

4 From the study by Pozzulo et al. (line-ups):

Describe how the cartoon foils were selected.

The foils were selected from images readily available on the internet, chosen because they had a similar appearance to Dora or Diego. Three judges rated 10 pictures for each target on how similar they were to the target, based on features such as facial structure, hair length and hair colour. The four cartoon characters receiving the highest similarity scores were used as the foils in that target's line-up.

[4]

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5 From the study by Perry et al. (personal space):

(a) One feature of the sample was that it consisted of only male participants.

Identify **two** other features of the sample used in the study.

1 *There were 54 participants.*

2 *They were undergraduates at the University of Haifa.*

[2]

(b) Explain **one** weakness of using animations in Experiment 1 in this study.

Using animations lacks ecological validity, because watching an animated figure approach on a computer screen is not an everyday experience. Participants may choose a different distance from when a real person invades their personal space.

[2]

6 **(a)** In the background to their study, Saavedra and Silverman (button phobia) outlined the role of disgust in childhood phobias.

Outline the role of disgust in childhood phobias.

Disgust is a feeling of aversion or revulsion towards something offensive. When disgust interacts with fear it can result in avoidance behaviours. Children can negatively evaluate a specific object, being repulsed by a previously neutral stimulus, without any anticipation of threat from it, so as there is no fear, it must be disgust causing the negative evaluation. A study of children with spider phobia found that disgust decreased as fear decreased, showing a link. [3]

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(b) Two friends, Hannah and Josh, are discussing the generalisability of the study by Saavedra and Silverman (button phobia).

Hannah says the study is generalisable, but Josh says it is **not** generalisable.

Outline why you think **either** Hannah **or** Josh is correct, using evidence from the study.

The friend who I think is correct is: *Josh*

because: *The sample was just one 9-year-old Hispanic-American boy with a rare button phobia, so it is difficult to generalise to other people with phobias. His phobia came from a unique experience, a bowl of buttons falling on him in a classroom, so the results may only apply to him. Also, other children may rate buttons differently on the Feelings Thermometer, as the ratings are subjective. So imagery exposure therapy may not work for people with more common phobias.*

[4]

7 The nature versus nurture debate relates to the study by Bandura et al. (aggression).

Outline what is meant by this debate, including **one** example from the nature side and **one** example from the nurture side from the study by Bandura et al.

Nature is the view that behaviour is genetically encoded and present from birth, whereas nurture is the view that behaviour is learned through experiences after birth. Nature: boys were more physically aggressive than girls, which may be due to their higher levels of hormones such as testosterone. Nurture: the children had been matched on their pre-existing aggression levels, yet those who watched an aggressive model imitated far more aggression than those who saw a non-aggressive model, so the aggression was learned.

[4]

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8 Pauline, a teacher, is helping her class of younger children to learn a new skill. This skill has a correct sequence of tasks. However, many children are getting this sequence wrong. Pauline needs to help the children and has come to you for advice.

Using your knowledge of the study by Fagen et al. (elephant learning):

(a) Outline the advice you would give to Pauline.

Pauline should use positive reinforcement; every time a child gets a step of the sequence correct, they get a reward they want. She could use a secondary reinforcer, such as tokens, which the children can exchange for something they desire, like extra play time. She should teach each step on its own, then shape the sequence by rewarding attempts that get closer to the correct order, for example rewarding one correct step, then two correct steps in a row, and so on. She should not punish children who get it wrong.

..... [4]

(b) Explain **one** reason for **one** piece of advice you outlined in part **(a)**.

Operant conditioning predicts that rewarding a behaviour increases the probability that it will be repeated. In Fagen et al., shaping the elephants' behaviour with rewards led to a successful trunk wash sequence.

..... [2]

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Section B

Answer **all** questions.

9 **(a)** From the study by Baron-Cohen et al. (eyes test):

Describe the psychology being investigated.

The study investigated theory of mind: our ability to attribute mental states, such as thoughts, beliefs and emotions, to ourselves and to others. It is linked to empathy, as we imagine what another person is feeling by putting ourselves in their shoes. We use this to understand that others may have different beliefs and emotions from us, and to explain and predict their actions. It can be tested with the Eyes Test, where people judge the mental state of a person by looking only at photographs of their eyes. Adults with AS/HFA are thought to have a deficit in it.

..... [4]

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(b) Explain **two** similarities between the study by Baron-Cohen et al. (eyes test) and the study by Andrade (doodling).

1 *Both studies were experiments with an independent variable, so they were trying to establish cause and effect. In Andrade, the IV was whether participants were in the doodling or the non-doodling condition while listening to the phone message. In Baron-Cohen, the IV was natural, based on whether a person had been diagnosed with AS/HFA or not, and the DV was their score on the eyes test. So both compared conditions to see the effect of one variable on performance.*

2 *Both studies collected quantitative data, which made comparisons objective and easy to analyse statistically. In Andrade, the number of names and places each participant correctly recalled was counted, so the recall of doodlers and non-doodlers could be compared. In Baron-Cohen, each participant gained a score out of 36 on the revised eyes test, so the AS/HFA group could be compared with the control groups. So both could show clear differences between groups.*

[8]

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10 Evaluate the study by Hölzel et al. (mindfulness and brain scans) in terms of **two** strengths and **two** weaknesses. At least one of your evaluation points **must** be about self-reports.

One strength is the use of a self-report questionnaire, the FFMQ, which collected quantitative data and so allowed meaningful comparisons. Participants completed it at two time points, before and after the 8-week MBSR course (or the waiting period for controls). This meant changes in all five facets of mindfulness, such as observing and acting with awareness, could be compared between the two groups, to test whether the course increased mindfulness.

A second strength is that the study was well controlled. There was a control group who did not take the course, and both groups were MRI scanned before and after the same 8-week interval, so the increase in grey matter concentration in the MBSR group, for example in the left hippocampus, could be attributed to the mindfulness training. The MRI data is objective, as it cannot be faked.

However, a weakness of the self-reports is that they may be affected by social desirability and demand characteristics. The MBSR participants knew they had just completed a mindfulness course, so they may have rated themselves as more mindful on the FFMQ to give the "right" answer or to justify their effort, making the data less valid.

Another weakness is the sample. Only 16 participants took part in the MBSR group, and they were volunteers from the Boston area who were already looking to reduce their stress, so they may have been more motivated than other people. This makes it difficult to generalise the findings.

Overall, the combination of quantitative self-reports and objective scans makes the study useful, but the small volunteer sample and possible bias in the self-reports limit its conclusions.

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