

Hassett et al. (monkey toy preferences)

AS

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What you need to know

The syllabus asks the same things of every core study. For Hassett et al. (2008) you should be able to:

1. **Explain the psychology being investigated:** sex differences, socialisation, play and the role of hormones.
2. **Give the background:** why studying monkeys, whose behaviour is thought to be less shaped by society than children's, can help to separate biology from upbringing.
3. **State the aim** of the study.
4. **Describe the procedure and its methodology:** the research methods (an experiment, with data collected by observation using a behavioural checklist, plus correlations), the sample (species, numbers, sex, age, where they lived, how they were chosen), the experimental design, the controls, the toys, the variables changed and measured, and the housing.
5. **Discuss the ethical issues** using the guidelines for research with animals: minimising harm, replacement, species, numbers and procedures (pain and distress, housing, reward and deprivation).
6. **Give the results:** the main findings for males and females (how often and how long they played with each type of toy, and which they preferred), the correlations with rank, the comparison with children, and how the results could be shown, for example in a bar chart.
7. **State the conclusions** that were or could be drawn.
8. **Evaluate every part of the study:** its methods, sample, data, validity, reliability, generalisability, ethics and usefulness.
9. **Relate it to the AS issues and debates:** nature versus nurture, the use of animals in research, the application of psychology to everyday life, individual and situational explanations, and the use of children (as a contrast: no children took part, but their data from another study were compared).
10. **Explain why it belongs to the biological approach** and compare it with the other core studies, especially Dement and Kleitman and Hölzel et al.

Understand it

Background: boys' toys, girls' toys

In most countries boys, on average, play more with toys such as cars and trucks, and girls, on average, play more with dolls and soft toys. There are two possible explanations:

- **Socialisation:** children learn which toys are "for" their sex from parents, friends, advertising and shops.
- **Biology:** hormones before birth push boys and girls towards different kinds of play. Girls exposed to unusually high levels of male hormones before birth (a condition called congenital adrenal hyperplasia) tend to play more with boys' toys, and an earlier study had found that vervet monkeys showed sex differences in toy choice too.

Children can't be studied without socialisation, because they grow up surrounded by it. Monkeys can. They have hormones much like ours, but nobody tells a monkey that trucks are for boys. If male and female monkeys still choose different toys, socialisation can't be the whole explanation.

The psychology

- **Sex differences:** differences in behaviour between males and females that come from biological differences, such as chromosomes and hormones.
- **Hormones:** chemical messengers in the blood. The main male hormone is **testosterone** (an androgen); the main female hormone is **oestrogen**. Androgens before birth are thought to affect later behaviour, including play.
- **Play:** any physical or mental activity done for enjoyment in free time.
- **Socialisation:** any process that changes a person's behaviour to fit what their society or culture expects, for example praise for "suitable" toys or teasing for "unsuitable" ones.
- **Nature versus nurture:** toy preference could come from nature (hormones) or nurture (socialisation), or both.

The aim

To investigate whether **male and female rhesus monkeys differ in their preferences for wheeled and plush toys**, and whether these sex differences are **similar to those found in human children**.

The sample

- **Rhesus monkeys** from one troop of **135** at the **Yerkes** National Primate Research Center field station in the USA.
- The troop had lived together for **more than 25 years**, in family groups (a **matrilineal** social structure: rank passes down through the mothers).
- Ages ranged from **3 months to over 13 years**.

- **14** monkeys were not used because they had received **hormonal treatment**, and **39 infants** were not used because their interactions with the toys could not be reliably coded (they were too young to identify reliably on the video). That is **53** excluded, leaving **82 potential participants: 61 females and 21 males**.
- The final sample used in the data analysis was **34 monkeys: 23 females and 11 males**.
- **Sampling technique**: an opportunity sample, the monkeys already living in one troop at the research centre.

Housing

- A **25 m × 25 m outdoor compound** with **temperature-controlled indoor quarters**.
- **Water** was available all the time.
- **Monkey chow** twice a day, and **fruit and vegetables** once a day.
- They lived in their **natal (family) groups**, as a social species should. This followed the US National Institutes of Health (NIH) guidelines, including environmental enrichment.

The toys

Wheeled ("masculine") toys

Wagon, truck, car, construction vehicle, shopping cart, dump truck

Plush ("feminine") toys

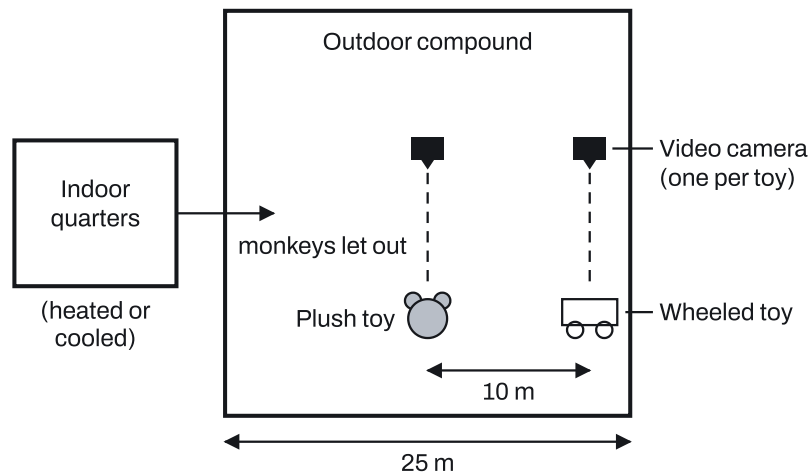
Winnie-the-Pooh, Raggedy Ann, koala, armadillo, teddy bear, Scooby-Doo, turtle

Learn at least two from each list. "Vehicle" on its own is not enough.

The procedure for one trial

1. The monkeys were kept in the **indoor** quarters.
2. **One plush toy and one wheeled toy** were placed in the **outdoor** compound, **10 m apart**.
3. Which toy went on the **left or right** was **counterbalanced** across trials.
4. The monkeys were let out into the outdoor area.
5. Each trial lasted **25 minutes** and was **videotaped**, with a **separate camera on each toy**. No observer stood in the compound.

After the trials, **two observers** watched the tapes and coded every interaction with each toy using a **behavioural checklist** of defined actions. For example, **drag** meant moving the toy along the ground with the toy behind the monkey. From the coding they measured the **frequency** (how many times) and **duration** (how long) of each monkey's play with each type of toy.



Toy sides swapped between trials (counterbalanced)

Methods and design

- **Research method:** an **experiment**, but not a laboratory experiment: it took place in the monkeys' own compound. The data were collected by **structured observation** (a behavioural checklist applied to video recordings). The observation was **non-participant**, and the monkeys could not see anyone watching.
- **Independent variables:** the **sex** of the monkey (male or female; naturally occurring, not manipulated) and the **type of toy** (wheeled or plush).
- **Dependent variables:** the **frequency** and **duration** of interaction with each toy, and from these, each monkey's preference.
- **Experimental design:** **independent measures** for sex (each monkey is either male or female) and **repeated measures** for toy type (each monkey's play with wheeled toys is compared with its own play with plush toys).
- **Controls:** two toys at a time, a fixed 10 m apart; counterbalanced left and right positions; the same 25-minute length; cameras instead of people in the compound.
- **Correlations:** each monkey's **rank** (social status) was correlated with how often and how long it played with the toys.
- **Data:** **quantitative** (frequencies, durations, percentages).

The results

Males played with wheeled toys **more often** (about **10** times on average) and **for longer** than with plush toys. **73%** of males (8 of the 11) **preferred wheeled toys**.

Females were **more varied**. On average they played with plush toys slightly more often than wheeled toys, and for only slightly longer. As individuals, some preferred wheeled toys, some plush toys and some had no preference; more females preferred wheeled toys than plush toys.

Sex differences:

- Males played with **wheeled** toys for **longer** than females did.

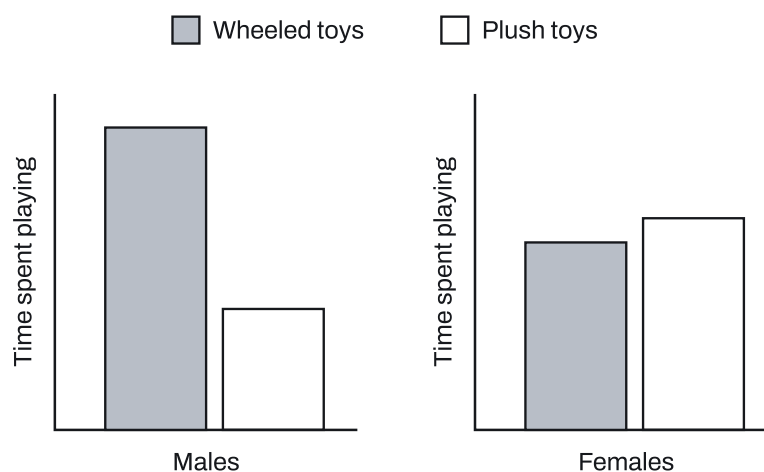
- Females played with **plush** toys **more often** than males did.
- So the gap between wheeled and plush play was much bigger for males than for females.

Rank (correlations):

- A **positive correlation** between rank and the **total frequency** of play with the toys, for both sexes together and for females on their own: higher-ranking monkeys played with the toys more.
- For females, a **positive correlation** between rank and the **duration** of play with **plush** toys (not wheeled toys): higher-ranking females played with plush toys for longer.
- For **males**, **no correlation** between rank and play.

Compared with children (data from an earlier study of children): male monkeys and boys both showed a strong, consistent preference for wheeled ("masculine") toys, and both spent longest with them; female monkeys and girls were both more varied in their preferences.

Showing the results: a **bar chart**, because sex (male, female) and toy type (wheeled, plush) are separate categories. The categories (male and female, or wheeled and plush) go on the horizontal axis, and time spent playing (or frequency) goes on the vertical axis. The illustration below draws one small chart for each sex, with the two toy types side by side.



Direction only, not real values. Each sex is on its own scale, so do not compare bars across the two charts.

The conclusions

- Sex differences in toy preference in rhesus monkeys **match those of children**, even though the monkeys had no human socialisation about toys.
- So toy preferences probably reflect **hormonally influenced** behavioural and thinking biases (nature), which **social processes** then build on and strengthen (nurture) in humans.
- Socialisation is not needed for a preference for wheeled toys to appear in males.

Why it is biological

It explains a behaviour, toy choice, through biological sex and the action of hormones before birth, and uses a closely related species to look at that behaviour with as little socialisation as possible. This fits the assumption that behaviour can be explained by hormones, genetics and evolution, and that differences between individuals can be understood through biological factors interacting with other factors.

Key facts and formulas

There is no formula list in the 9990 exam. "Learn it" means you must remember it.

Fact	Status
Hassett et al. sample: rhesus monkeys from a troop of 135 at Yerkes; 82 potential participants (61 females, 21 males); 34 analysed (23 females, 11 males)	Learn it
Hassett et al. exclusions: 14 for hormonal treatment and 39 infants not coded, 53 in total	Learn it
Hassett et al. housing: 25 m × 25 m outdoor compound, temperature-controlled indoor quarters, water always available, monkey chow twice a day, fruit and vegetables once a day, family groups	Learn it
Hassett et al. trial: one wheeled and one plush toy, 10 m apart, sides counterbalanced, 25 minutes, one camera per toy	Learn it
Hassett et al. results: males played with wheeled toys more often and for longer than plush toys, and 73% of males preferred wheeled toys; females were more varied	Learn it
Hassett et al. rank: positive correlation with total frequency of play (all, and females); with duration of plush play in females; none in males	Learn it
Ethical guidelines for animals: minimising harm, replacement, species, numbers, procedures (pain, suffering and distress; housing; reward, deprivation and aversive stimuli)	Learn it
Percentage = $\frac{\text{part}}{\text{whole}} \times 100$	Learn it

How to do it

We have tagged 18 questions on this study, from 2024 to 2026 (Papers 1 and 2). 11 of them have parts of two types, so the counts add up to 29.

Question type	Questions
Procedure, sample, toys and housing	7
Results, including rank and sex differences	5
Evaluation: validity, observations, generalisability	5

Question type	Questions
Ethics of using animals	3
Research methods applied to the study	3
The psychology investigated and conclusions	3
Comparing with another study	2
Applications to everyday life	1

1. Procedure, sample, toys and housing (7 questions)

Mostly 1–5 mark recall questions, one mark per correct point.

1. **Find which part is asked for:** the **sample** (the monkeys), the **housing** (where and how they lived), the **trial procedure** (what happened during one 25-minute trial) or the **toys**. Don't answer a sample question with the procedure.
2. **Give separate, specific points**, one per mark, with the exact numbers.
3. **Don't repeat what the question gives you:** if it says "other than sex and species" or "troop of 135", use different features.

Variations you will meet:

- **Sample features:** rhesus monkeys; troop of 135; lived together more than 25 years; at Yerkes; matrilineal family groups; ages 3 months to over 13 years; 14 excluded for hormonal treatment; 39 infants not coded; 53 excluded in total; 82 potential participants (61 females, 21 males); 34 analysed (23 females, 11 males). Generic points such as "a small sample" earn nothing.
- **The final sample size:** 34 (11 males and 23 females).
- **Housing:** 25 m × 25 m outdoor compound; temperature-controlled indoor quarters; water all the time; monkey chow twice a day; fruit and vegetables once a day; natal family groups for 25 years. Keep indoor and outdoor features apart, and remember it was a research centre, not the wild.
- **The trial procedure** (only what happened during the trial): monkeys kept indoors; one plush and one wheeled toy placed outside; 10 m apart; left and right counterbalanced; monkeys let out; videotaped; one camera per toy; 25 minutes; naming one of the toys. Coding the tapes, the checklist and the two observers came **after** the trial, so they earn nothing here.
- **Name toys:** wheeled are wagon, truck, car, construction vehicle, shopping cart, dump truck; plush are Winnie-the-Pooh, Raggedy Ann, koala, armadillo, teddy bear, Scooby-Doo, turtle.
- **A checklist behaviour:** "drag" is moving the toy along the ground (1) with the toy behind the monkey (1). "Dragging the toy" repeats the word and earns nothing.

2. Results, including rank and sex differences (5 questions)

1. **Read exactly what is asked:** males or females, frequency or duration, wheeled or plush, sex difference or toy-type difference.

2. **Give a meaningful comparison** for 2 marks: "males played with wheeled toys for longer than with plush toys". Without the comparison ("males played with wheeled toys for longer") it earns 1.
3. **Add data when asked**: about 10 interactions with wheeled toys for males, or 73% of males preferring wheeled toys.

Variations you will meet:

- **A result for males**: compare wheeled with plush within the males, not males with females, unless the question asks for a sex difference.
- **A result for females**: plush slightly more often and slightly longer than wheeled; or more females preferred wheeled toys than plush. Comparing females with males gets at most 1 mark here.
- **A sex difference in frequency of plush play**: females played with plush toys more often than males (2 marks). Don't switch to duration or preference.
- **Duration of wheeled play**: males played with wheeled toys for longer than females did, or than with plush toys. "Played more" is frequency, not duration.
- **Rank and duration in females**: a positive correlation between rank and the duration of play with plush toys, but not with wheeled toys. Name the toy type, or the answer gets at most 1.
- **A correlation from the study**: name its direction and both variables, for example a positive correlation between rank and total frequency of play with the toys in females.

3. Evaluation: validity, observations, generalisability (5 questions)

Short questions (2–4 marks). Identify the strength or weakness (1 mark), then explain it with a detail from this study (1 mark or more).

Point	Strength or weakness	Example from the study
Ecological validity	Strength	The monkeys were tested in their own familiar compound with their own group, so their behaviour was natural
Mundane realism	Weakness	Choosing between human toys is not an everyday activity for a rhesus monkey
Controls (internal validity)	Strength	Two toys only, always 10 m apart, sides counterbalanced, 25 minutes each, so toy type rather than position affected play
Video recording, no observer present	Strength	Monkeys couldn't react to an observer, and play could be replayed and timed precisely, so the measures were objective
Behavioural checklist	Strength	Defined behaviours (such as drag) made the coding consistent and the study replicable
Quantitative data	Strength	Frequencies and durations allowed direct comparison of males and females and of wheeled and plush toys
Generalisability	Weakness	Only 34 captive rhesus monkeys from one troop; wild monkeys, or children, may behave differently

Point	Strength or weakness	Example from the study
Uncontrolled participant variables	Weakness	Past experience with new objects or simple curiosity might have drawn some monkeys to particular toys, not their sex
Toy categories	Weakness	Wheeled and plush toys differ in many ways (movement, texture), so the monkeys may have chosen on those features, not on "masculine" or "feminine"

Variations you will meet:

- **"Explain one strength in relation to observations"**: use the video (objective timing, no observer effect), the checklist, or two observers using the same checklist. Inter-observer reliability was **not measured**, so a point about it earns at most 1.
- **"Explain one weakness"**: generalisability (captive monkeys) or mundane realism are safest. Don't use "monkeys can't talk", "it doesn't generalise to humans" as the whole explanation, or "cruel because they're not in the wild": the monkeys were bred in captivity.
- **"Is the study valid?" (a choice between two views)**: pick one side, name the type of validity (ecological, internal, mundane realism, population; 1 mark), then give up to three linked pieces of evidence. Reliability, standardisation and replicability earn nothing here.

The 10-mark evaluation ("two strengths and two weaknesses, at least one about ..."):

1. Plan four points of **equal depth**, one of which is the **named issue**. Without it the answer is capped at Level 3 (6 marks).
2. For each point: say what the issue is, whether it is a strength or weakness of **this** study, give specific details from the study, and explain **why** it matters for the conclusions.
3. Don't describe the study for its own sake, and use only the animal guidelines for ethics.

4. Ethics of using animals (3 questions)

1. **Name the guideline** (minimising harm; replacement; species; numbers; procedures: pain, suffering and distress, housing, reward and deprivation).
2. **Link it to Hassett et al.** with a specific detail. A description with no guideline linked ("lots of space") is not enough when the question asks for named guidelines.

Guideline	How Hassett et al. met it
Housing	Socially housed in their natal troop, as a social species needs; 25 m × 25 m outdoor compound and temperature-controlled indoor quarters
Reward and deprivation	Not deprived: water always available, monkey chow twice a day and fruit and vegetables daily; NIH enrichment guidance followed
Pain, suffering and distress	Tested in their own familiar compound; filmed by cameras so no strangers were present; the toys were harmless

Guideline	How Hassett et al. met it
Minimising harm	Nothing was done to the monkeys apart from offering toys (though one monkey did tear a toy apart, so toys need checking for safety)
Species	Rhesus monkeys are close to humans on the evolutionary scale, so they are a suitable species for comparing with children
Numbers	Only the existing troop was used; no extra animals were bred or brought in
Replacement	Could old video of monkeys have been used instead? Studying live play with new toys needed real monkeys

5. Research methods applied to the study (3 questions)

- **What an experiment is:** an IV is manipulated (or compared) and a DV measured (1), with other variables controlled (1), to find cause and effect (1).
- **An IV:** sex (male or female), or type of toy (wheeled or plush).
- **Strengths of experiments:** controls mean only the IV affects the DV, so cause and effect can be claimed; a standardised procedure can be replicated; quantitative data allow direct comparison; counterbalancing reduces order and position effects.
- **Positive and negative correlations:** both are relationships between two measured variables; in a positive one both rise together, in a negative one one rises as the other falls. Example from Hassett: positive correlation between rank and total frequency of play.
- **The graph:** a bar chart, because the data are in separate categories (male and female; wheeled and plush), so they can be compared side by side, with time spent playing on the vertical axis.

6. The psychology investigated and conclusions (3 questions)

1. **"Describe the psychology":** one mark per correct concept (sex differences, hormones such as testosterone and oestrogen, play, socialisation, nature versus nurture), plus at most one mark for an example from the study (whether male and female monkeys preferred masculine or feminine toys). Don't write about the monkeys' "gender".
2. **Socialisation** for 2 marks needs both ideas: a process that **changes or shapes** behaviour (1) to fit **what society or culture expects** (1).
3. **A conclusion** is a general claim, not a result. Full marks need three ideas: hormones (biology), a behavioural or thinking bias, and social processes. "Toy preferences in monkeys reflect hormonally influenced behavioural and cognitive biases, which social processes then shape" (2 marks); "toy preference is affected by hormones and socialisation" (1 mark); "males preferred wheeled toys" is a result (0).

7. Comparing with another study (2 questions)

The 8-mark part of Paper 1 Question 9 or 10: explain a similarity and a difference, **4 marks each**, marked in levels:

Level	What it needs
4	The point is well explained, with an example from both studies
3	Well explained with one study's example, or both studies used briefly
2	Brief, with an attempt at one example; or well explained with no example
1	Brief, with no examples

1. **Choose a point you can develop:** type of data, research method, experimental design, ethics, controls, nature and nurture.
2. **State the point, give each study's detail, then explain** what follows from it.
3. **Obey the question's conditions:** if the sample is banned, "different species" earns nothing at all; if approaches are banned, don't use "both biological". "Different aims" is always Level 1.

Useful points:

- **Quantitative data** (similarity with Saavedra and Silverman, or Dement and Kleitman): Hassett et al. counted how often and how long monkeys played with each toy; Saavedra and Silverman's boy rated his distress about buttons on a 0–8 Feelings Thermometer each session; Dement and Kleitman counted dreams recalled after REM and NREM awakenings. Numbers allow direct comparison across groups, conditions or sessions.
- **Research method** (difference with Saavedra and Silverman): Saavedra and Silverman was a **case study** of one boy, using self-report ratings and direct contact with him in therapy; Hassett et al. was an experiment using **structured observation** of many monkeys on video, with no direct contact. So Saavedra and Silverman gives rich detail about one person, while Hassett et al. compares groups.
- **Ethics** (similarity with Hölzel et al.): both followed the rules of the bodies relevant to them: Hassett et al. followed NIH guidance on housing and enrichment for animals; Hölzel et al. had approval from a hospital and medical school and gained informed consent from human participants.
- **Experimental design:** Hassett et al. used independent measures for sex but repeated measures for toy type; Hölzel et al. compared each participant's brain before and after a mindfulness course (repeated measures) as well as against a control group (independent measures). Dement and Kleitman used repeated measures (every participant woken in both REM and NREM).
- **Nature and nurture** (difference with Saavedra and Silverman): Hassett et al. points to nature (hormones shaping toy choice without socialisation); Saavedra and Silverman points to nurture (a phobia learned from an event and treated by learning).
- **Technique:** Hölzel et al. used MRI scans of brain structure; Hassett et al. measured no physiology, only behaviour on video.

8. Applications to everyday life (1 question)

Marked in bands: say **what** the application is and **how** it would be done, using the study. One application in depth, or two or three in less depth, can reach full marks. They must be ethical and forward-looking (something you would do), not an explanation of behaviour.

- **Toy design and marketing:** toy companies could design toys with features each group plays with longer (wheels and movement; soft, cuddly toys), and test new toys by measuring how long children choose to play with them, as the study timed play.
- **Advertising:** adverts for wheeled toys could focus on what boys tend to prefer, while also showing both sexes, since girls (like female monkeys) vary more.
- **Enrichment for captive primates:** zoos and rehabilitation centres could give monkeys toys known to keep them interested, offering wheeled toys to males, to reduce boredom.

Don't write about gender issues or mental health, and don't give more than three applications.

Worked examples

Example 1

From the study by Hassett et al. (monkey toy preferences):

- (a) Describe the sample of monkeys whose data were analysed. [3]
- (b) Outline one result about the rank of the male monkeys and their play with the toys. [2]
- (a) They were rhesus monkeys from a troop of 135 at the Yerkes research centre (1). The troop had lived together in family groups for more than 25 years (1). The data of 34 monkeys were analysed: 23 females and 11 males (1).
- (b) There was no correlation between a male monkey's rank and how often or how long it played with the toys (1: **result**), unlike the females, where higher-ranking monkeys played with the toys more often (1: **meaningful comparison**).

Example 2

From the study by Hassett et al. (monkey toy preferences):

- (a) Describe the procedure for one trial. [4]
- (b) Explain why the left and right positions of the two toys were counterbalanced. [2]
- (a) The monkeys were kept in their indoor quarters while one wheeled toy, such as a wagon, and one plush toy were placed in the outdoor compound (1). The two toys were 10 m apart (1), and which one was on the left was counterbalanced across trials (1). The monkeys were then let out, and the 25-minute trial was filmed with a separate camera on each toy (1).
- (b) Counterbalancing stops the position of a toy from becoming an extraneous variable (1). If the wheeled toy were always on the side nearer the door, monkeys might reach it first and play with it more for that reason alone; swapping sides between trials means a preference can be put down to the type of toy, not where it stood (1: **example from the study**).

Example 3

(a) Outline two named ethical guidelines for the use of animals, with reference to the study by Hassett et al. (monkey toy preferences). [4]

(b) Explain one similarity and one difference between the study by Hassett et al. (monkey toy preferences) and the study by Dement and Kleitman (sleep and dreams). Do not refer to the sample in your answer. [8]

(a) Housing (1): the monkeys were kept in their natal troop, as a social species should be, with a 25 m × 25 m outdoor compound and temperature-controlled indoor quarters **(1)**. **Reward and deprivation (1):** they were not deprived of anything, as water was always available and they were fed monkey chow twice a day and fruit and vegetables daily **(1)**.

(b) Similarity. Both studies collected quantitative data. Hassett et al. recorded how often and for how long each monkey played with the wheeled and the plush toy, and Dement and Kleitman counted how many dreams were recalled after REM and after NREM awakenings. Because both produced numbers, conditions could be compared directly and objectively, without anyone having to judge or interpret what they saw. **(Level 4: well explained, with an example from both studies.)**

Difference. The studies used different techniques to collect data. Dement and Kleitman measured the body directly with an EEG, recording brain waves and eye movements all night, and then interviewed participants about their dreams. Hassett et al. measured no physiology: they filmed behaviour and coded it afterwards with a behavioural checklist, without any contact with the monkeys. So Dement and Kleitman could link a mental experience to a physical measure, while Hassett et al. could only infer the role of hormones from behaviour. **(Level 4.)**

Each point is worth 4 marks, so 8 in total. "They had different aims" would stay in Level 1, and "one used monkeys and one used humans" would score nothing, because the sample is banned.

Example 4

Evaluate the study by Hassett et al. (monkey toy preferences) in terms of two strengths and two weaknesses. At least one of your evaluation points must be about reliability. [10]

Plan: strengths are reliability (the named issue) and quantitative data; weaknesses are generalisability and mundane realism. Each paragraph has the point, details from the study and why it matters.

Strength 1: reliability (the named issue). The procedure was standardised, so it could be repeated and checked. Every trial used one wheeled and one plush toy, placed 10 m apart with their sides counterbalanced, and lasted 25 minutes. Play was filmed rather than noted live, and afterwards the tapes were coded with a behavioural checklist of defined actions, such as "drag", by two observers using the same checklist. Because the behaviours were defined in advance and the tapes could be replayed, another researcher could code them in the same way and should reach the same frequencies and durations. (One limit: agreement between the two observers was not measured, so this can't be proven.)

Strength 2: quantitative data. The study measured how often and for how long each monkey played with each toy. These numbers can be compared directly: for example, males played with wheeled toys more often and for longer than with plush toys, and 73% of males preferred wheeled toys. Numbers like these don't depend on an observer's opinion, so the sex difference is objective and can be compared with the data from children.

Weakness 1: generalisability. Only 34 monkeys were analysed, all from one captive troop at one research centre, and 39 infants were left out because their play could not be coded. Captive monkeys that have lived with keepers for 25 years may react to new objects differently from wild rhesus monkeys, and monkeys are not children. So the conclusion that toy preference is partly hormonal can only be applied to children with caution.

Weakness 2: mundane realism. Choosing between a truck and a Winnie-the-Pooh toy is not something a rhesus monkey would do in everyday life. The monkeys may have been drawn to whichever toy was more novel or moved more, not to its "masculine" or "feminine" nature, so the measure of preference may not show what the researchers claimed.

How it would be marked: four points of equal depth, each with specific evidence and an explanation of why it matters, including the named issue (reliability): Level 5 (9–10 marks). Leaving out reliability would cap it at 6.

Common mistakes

- **Describing the procedure when asked for the sample.** Sample questions want facts about the monkeys (species, numbers, sex, where they lived), not what happened in the trials.
- **Generic sample points.** "A small sample" or "some were excluded" earns nothing; give the number (14 had hormonal treatment, 39 infants not coded).
- **Putting after-trial steps in the trial procedure.** Coding with the checklist, the two observers and measuring time spent all happened after the trial.
- **Mixing up indoor and outdoor,** or saying the study took place in the wild or the jungle. It was a research centre: the toys were in the outdoor compound while the monkeys waited indoors.
- **Calling it a laboratory experiment.** It was an experiment in the monkeys' own compound, using observation.
- **Vague toys.** "Vehicle" alone earns nothing; name a wagon, truck or dump truck.
- **Results with no comparison,** or the wrong comparison. "Males preferred wheeled toys" earns 1; "males preferred wheeled toys over plush toys" earns 2. If asked about females, compare their wheeled and plush play, not females with males.
- **Mixing frequency and duration.** "Played more" means frequency. If the question is about duration, write "for longer".
- **Giving a result as a conclusion.** A conclusion talks about hormones, biases and social processes, not which toy males chose.
- **Using the sample when it is banned** in a comparison question: "different species" then scores nothing.
- **Human ethical guidelines** (consent, debriefing, right to withdraw) earn nothing for this study; use the animal ones.

- **Inter-observer reliability as a strength.** It was not measured, so it earns at most 1 mark.

How to get the marks

- **"Identify" and "state"** need a short exact answer: a number, a toy, a feature. Only the first answer is marked when one is asked for.
- **"Outline"** needs the point with a little detail: "drag" needs moving the toy along the ground and the toy being behind the monkey.
- **"Describe"** needs several separate points, one mark each, with exact numbers (no tolerance on numbers in the sample).
- **"Explain"** needs a reason and a link to this study: the strength or weakness (1 mark) and an example from Hassett et al. (1 mark).
- **"You must use data"**: give a figure, such as 73% of males preferring wheeled toys or about 10 interactions with wheeled toys.
- **Ethics questions**: name the animal guideline (1) and link it to a detail of the study (1) for each.
- **Comparisons** (8 marks): two points, each with an example from **both** studies and an explanation, obeying what is banned.
- **"Evaluate ... two strengths and two weaknesses"** (10 marks): four equal points, the named issue included, specific evidence in each, no description.
- **Applications**: what it is and how it would be done, using the study, and ethical.

Quick check

1. State the number of male and female monkeys in the final sample, and the total.
2. Calculate the percentage of the 82 potential participants whose data were analysed, to 1 decimal place.
3. Outline one result about the frequency of play with plush toys that compares males and females.
4. Identify the independent variables and one dependent variable in this study.
5. Explain one way the study by Hassett et al. followed the ethical guideline of "species".

Answers

1. 11 males and 23 females: **34** in total.
2. $\frac{34}{82} \times 100 = 41.46 \dots$, so **41.5%**.
3. Female monkeys played with plush toys more often, on average, than male monkeys did.
4. IVs: the sex of the monkey (male or female) and the type of toy (wheeled or plush). DV: the frequency (or duration) of interaction with each toy.
5. The guideline says the species should suit the aim of the research (identification). Rhesus monkeys are close to humans on the evolutionary scale and have similar hormones, so they suited a study whose aim was to compare their toy preferences with children's ([link to the study](#)).

Past questions to try

- [9990/12/M/J/25 Q4](#): one result for male monkeys, using data.
- [9990/12/O/N/24 Q6](#): the procedure for a trial, then a strength of the observations.
- [9990/12/F/M/24 Q10](#): the 10-mark evaluation, with ethics as the named issue.
- [9990/22/O/N/24 Q2](#): positive and negative correlations, with an example from the study.