STUDY AND REVISION GUIDE

Cambridge
International AS & A Level

Psychology

Third Edition

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SUPPORTED BY Boost

HODDER Education

My revision planner

AS LEVEL

A LEVEL

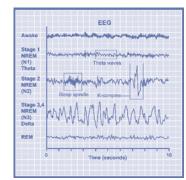|			REVISED	TESTED	EXAM READY

The Biological approach

The main assumptions

Biological psychologists assume that:

1 Behaviour, cognitions and emotions can be explained in terms of the working of the brain and the effect of hormones, genetics and evolution.
2 Similarities and differences between people can be understood in terms of biological factors and their interaction with other factors.

(Cambridge International, 2021)

These 'other factors' could be environmental, social and/or cultural. This shows that biological psychologists do not ignore other influences on behaviour, cognitions and emotions, just that their primary focus is on the impact of biological factors.

▲ Figure 1.1 An EEG measures electrical activity in the brain. It can be used to monitor time spent in different sleep stages (e.g. REM versus NREM)

1.1 Dement and Kleitman (sleep and dreams)

Psychology being investigated

Sleep

During sleep, the body is inactive. Conscious awareness is temporarily halted. Five sleep stages have been identified using **electroencephalography (EEG)**. Each stage is characterised by differing brain-wave activity (see Figure 1.1).

» Stages 1 and 2: light sleep; easily woken.
» Stages 3 and 4: deeper sleep; brain waves have higher amplitude and lower frequency than brain waves in stages 1 and 2.
» **Rapid eye movement (REM) sleep**: lower amplitude/higher frequency brain waves, similar to wakefulness; the eyelids move quickly but other muscles are paralysed; dreaming is common.

Ultradian rhythms

Ultradian rhythms are bodily cycles that repeat more than once every 24 hours.

» During the night, we move through several 90-minute sleep cycles.
» Earlier in the night, the cycles include a higher proportion of **non-REM (NREM) sleep**.
» Later in the night, we spend more time in stages 1, 2 and REM sleep.

Dreams are subjective memories of our experiences during sleep.

Background

» Kleitman conducted sleep research using his relatives as participants for many years.
» In 1953, his student, Aserinsky, used an EEG to identify REM and NREM sleep.
» Kleitman and Aserinsky also found that people woken in REM are more likely to report dreams than those woken in NREM.
» Dement and Kleitman wanted to find a **reliable** and **objective** way to measure whether a person is dreaming, using biological evidence rather than verbal self-reports.

> **STUDY TIP**
> Before revising each study, briefly read through the description and list any methodological terms with which you feel less confident. Review these in Chapter 5 *before* you begin. Reviewing the study should help to reinforce and consolidate your understanding. Using key terms like 'reliable' and 'objective', in the right context, will improve your written work.

Aims

1 To investigate whether dream recall is more common in REM than in NREM sleep.
2 To investigate whether participants can accurately estimate the duration of their dreams.
3 To investigate whether eye movements (vertical/horizontal) correspond with dream content.
4 To investigate whether there is a correlation between the duration of a REM sleep episode and the number of words (the narrative) used to describe any dreams experienced.

Methodology

Research methods and design: experiment with repeated measures design (aims 1–3) and correlation (aim 4).

Data collection techniques: self-report, interview.

Variables:

Independent variables – whether the participants were woken:

» during REM or NREM sleep (as shown by the EEG)
» following 5 or 15 minutes of REM sleep
» following REM sleep with mainly vertical, mainly horizontal, mixed or limited eye movements.

Dependent variables:

» whether a dream was reported or not (quantitative) – dream has to be described in detail to be counted
» perceived duration of dream:
  – initially participants were asked to report dream length in minutes
  – later the procedure was changed. Participants were instead asked whether they had been dreaming for 5 or 15 minutes (fixed/forced choice question, quantitative data)
» verbal description of dream content/narrative (qualitative data); number of words used (quantitative).

Sample:

Size: seven men, two women (five studied in depth, four to confirm results).

Demographic: from Chicago, USA.

Sampling technique: not stated in the journal article.

Overview of procedure

Participants slept:

» in a quiet, dark room at the University of Chicago
» with electrodes placed near the eyes and on the scalp:
  – wires were tied together to stop them from becoming tangled
  – the EEG machine was in an adjoining room.

Participants were woken:

» several times each night
» to self-report all the dependent variables (see above) using a bedside recording device.

The researchers:

» chose when to wake the participants using the EEG and a timer
» listened to the self-reports from the adjoining room

» occasionally entered the sleep room to interview the participant about their dream
  – they never revealed information about sleep stage or direction of eye movements when questioning the participants.

Controls
» Participants all:
  – abstained from alcohol and caffeine on the day of the study
  – reported to the laboratory at their normal bedtime.
» The same loud doorbell was used for all awakenings.
» The positioning and number of electrodes was standardised (2–3 near the eyes and on the scalp).

Ethical issues
» Confidentiality and privacy were maintained.
  – Participants were referred to using their initials.
  – Dream content was not paired with their initials.

NOW TEST YOURSELF   TESTED ☐

1.1   Outline the use of interviewing to gather qualitative data in this study.   [2]
1.2   Give one key feature of experiments as a research method, using an
      example from this study.   [2]

SKILLS BUILDER

Describe the use of correlations as a research method in this study.   [4]

To answer this question, you need to understand the difference between correlation and experiment. Refresh your memory of correlations on page 69 if you need to. Consider planning your answer carefully before you start writing. For example, what is a correlational study? How did the researchers operationalise their co-variables? What was the nature of the relationship? Why did the researchers use correlation not experiment for this part of the study?

SKILLS BUILDER

Suggest one or more reasons why Dement and Kleitman used an EEG in this study.   [3]

'Suggest' means to present ideas or considerations based on your knowledge and understanding of psychology. Little elaboration is required as you are not asked to explain or justify your reasons. You may explain what the EEG was measuring and why that was necessary in this study. You could also give strengths of using scientific equipment like an EEG.

Results   REVISED ☐

REM sleep never occurred immediately after sleep onset. All participants had regular REM sleep periods throughout the night:

» one REM period every 92 minutes (range 70–104 minutes)
» average REM sleep duration of 20 minutes (range 3–50 minutes)
» longer REM sleep periods later in the night.

▼ Table 1.1 Sleep stage and dream reporting

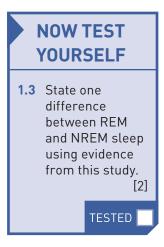| Sleep stage when woken	Frequency of dream reports
REM	80%
NREM	7%

▼ Table 1.2 Accuracy of dream duration estimates

Duration of REM before waking	Accuracy rate of dream duration estimates
5 minutes	88%
15 minutes	78%

One participant (DN) had a lower accuracy rate of only 65 per cent:

>> He underestimated dream length.
>> He was only correct 50 per cent of the time when woken after 15 minutes.

▼ Table 1.3 Eye movements and dream content

Eye movement	Dream content
Mainly vertical	Looking up and down while: >> operating a hoist at the bottom of a cliff where people were climbing >> climbing a series of ladders >> throwing basketballs into a net
Mainly horizontal	Watching two people throwing tomatoes at each other
Mixed	>> Talking in a group of people >> Searching for something >> Fighting with someone
Limited eye movement	Looking into the distance while driving a car

Correlation coefficients for REM duration and length of dream report (number of words) for each participant:

>> ranged from +0.40 to +0.71.
>> the average was +0.58.

Conclusions

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>> Dreams are more likely to be reported in REM than NREM sleep.
>> Dreams are experienced in real time – dream length and REM sleep duration match.
>> Eye movements in sleep are not random; they match dream content.
>> The subjective experience of dreaming can be measured objectively using EEG to identify REM sleep.

Evaluation

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▼ Table 1.4 Strengths and weaknesses of Dement and Kleitman

Strengths	Weaknesses
Reliability – the procedure was standardised (e.g. participants were always woken using the same loud doorbell), meaning the study can be replicated to test for reliability.	**Validity** – some data was discarded as recordings were too muffled and dreams could not be accurately transcribed.
Objectivity – the use of quantitative EEG data (e.g. amplitude and frequency of brain waves) removed bias when deciding whether sleep was REM or NREM.	**Generalisations** – only nine people were studied (and only five in detail); ages and occupations were not provided so individual differences may have affected results.

Issues and debates

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Application to everyday life

Understanding typical patterns of sleep and dreaming is important:

>> Psychologists can identify people whose sleep and dreams are unusual.
>> People are more likely to receive suitable treatment/support to improve sleep quality.

Nature versus nurture

>> Support for nature: all participants demonstrated ultradian REM/NREM sleep cycles and dreamed more during REM than NREM. This suggests these patterns are innate and may help us to survive.

» Support for nurture: dream content was diverse; differing life experiences affect what we dream about and may affect the duration of REM sleep.

> ### ► SKILLS BUILDER
>
> *Dement and Kleitman investigated ultradian rhythms. Outline one finding from this study that supports the nature side of the nature–nurture debate.* [2]
>
> This question has a stem – that is, a sentence before the question. Sometimes stems are helpful as they remind you of details from the study. However, the question does not say you have to refer to it.

1.2 Hassett *et al.* (monkey toy preferences)

Psychology being investigated

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Play

» **Play** is a universal, voluntary behaviour observed in the young of most species.
» Activities are often similar to adult behaviours.
» Play may be **adaptive**.

Sex differences

» Types of play and toy preferences differ between human infants with differing **sex chromosomes**.
» For example, XY boys typically prefer cars to dolls, whereas the reverse is true of XX girls.

Socialisation

» Many people believe these differences are due to society's differing expectations of girls and boys.
» Children learn these expectations through **socialisation**.
» Hassett *et al.* believed biological factors are also important.

The role of hormones

Sex **hormones** (e.g. testosterone, oestrogen) affect brain development. This may explain why boys and girls prefer toys that can be played with in different ways.

> **STUDY TIP**
> Give dual-coding a try. This means making notes in both a verbal and visual way. You could draw a diagram of the monkey enclosure to help to consolidate the procedure. Include the different areas (inside/outside), cameras, toys, etc. Swap your diagram with a classmate. Ask them to add labels and anything you have missed. When you revisit the study, cover your diagram and try to redraw it from memory.

Background

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» Hassett *et al.* (2008) were interested in research into **congenital adrenal hyperplasia (CAH)**. For example, XX girls with CAH prefer stereotypically masculine toys, even when encouraged to play with stereotypically feminine toys.
» Previous monkey research found that masculine toys were played with more by male than by female monkeys; likewise, female monkeys showed a strong preference for feminine over masculine toys.
» As monkeys are not affected by societal expectations about gender-appropriate behaviour, Hassett *et al.* believed **sex differences** in toy preferences are determined by nature more than nurture.

Aims

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1 To investigate sex differences in monkey toy preferences when presented with a stereotypically feminine toy and a stereotypically masculine toy.
2 To provide support for the role of nature (not nurture) in shaping sex differences in human toy preferences.

Check your answers at **www.hoddereducation.com/cambridgeextras**

> ### ▶ SKILLS BUILDER
>
> *Explain why the study by Hassett* et al. *is from the Biological approach.* [2]
>
> The command term 'explain' means that you need to think about reasons why the study by Hassett *et al.* is part of the Biological approach. First, think about key terms/phrases from the main assumptions of the approach, such as 'working of the brain' and 'hormones'. Which words/phrases link best to the 'psychology being investigated' and/or the background of Hassett *et al.*? Your first sentence could state a reason and the second sentence could show detailed knowledge of the study to support the reason you have given.

Methodology

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Research methods and design: experiment with independent measures design.

Data collection techniques:

- » Seven 25-minute controlled, non-participant, covert observations of monkeys in their normal outdoor enclosure.
- » A behavioural checklist was used by two observers to analyse the video recordings.

Variables:

Independent variable – whether the monkey was male or female.

Dependent variable – whether monkeys spend longer (in seconds) interacting with the wheeled toy or the plush toy.

Other information collected – age (juvenile, adult) and social rank (determined through observation of grooming).

Sample:

Size: 135 juvenile and adult monkeys; 14 excluded (previous participation in hormone research); 39 infants excluded (looked too alike to accurately record sex).

Demographic: the monkey troop had lived together at a research centre for 25 years.

Sampling technique: opportunity; the analysis included data from 23 females and 11 males, each of whom interacted with the toys at least five times.

Overview of procedure

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- » Different pairs of wheeled and plush toys were used in each observation (e.g. wagon/teddy, truck/Scooby-Doo).
- » Observers recorded:
  - – duration of toy interactions (in seconds)
  - – specific behaviours using a behavioural checklist (e.g. holding, dragging).
- » Unclear behaviours were discussed between the two observers.

Controls

- » Monkeys were kept indoors while toys were positioned.
- » Toys were placed 10 m apart.
- » Toy positions were counterbalanced – that is, whether wheeled/plush toys were on the right/left side of the enclosure.

Ethical issues

- » *Guide for the Care and Use of Laboratory Animals* guidelines were upheld, such as appropriate housing:
  - – appropriate housing (25 m^2 outdoor enclosure with a temperature-controlled indoor area)
  - – constant access to water, daily monkey chow and fresh fruit and vegetables.
- » The research was regulated by the Emory University Institutional Animal Care and Use Committee.

> **NOW TEST YOURSELF**   TESTED ☐

1.4 Outline two reasons why some of the monkeys were not included in the final sample. [2]
1.5 Give one weakness of the use of a behavioural checklist in this study. [2]
1.6 Give one strength of the use of controlled observation as a way of collecting the data in this study. [2]

> **SKILLS BUILDER**

Give one strength of using animals as participants in this study. [2]

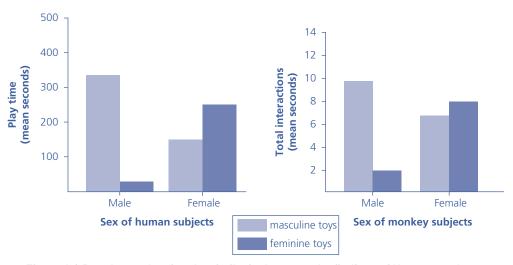The command term 'give' means you do not need to give a reason for your strength. Think generally about why psychologists might prefer to use animals rather than humans in their research (see page 79). As the question says 'in this study', you must relate your point specifically to Hassett *et al.* For example, naming a controlled variable and showing how this would be impossible with humans.

Results   REVISED ☐

- 73 per cent of the males preferred wheeled toys, 9 per cent preferred plush toys and 18 per cent showed no significant preference.
- 30 per cent of females preferred the plush toys, 39 per cent preferred the wheeled toys and 30 per cent showed no significant preference for either toy.
- The data from the monkey observations were compared with data from a similar study using children. Figure 1.2 shows the similarity between the two sets of results.
  - Both sets of results show that males significantly prefer masculine to feminine toys and, although there is a difference in the preference of females for feminine toys, this is far less pronounced, especially in the monkeys.

Sex difference in play with stereotypical masculine and feminine toys in human participants

Sex difference in total frequency of interactions with plush and wheeled toys by rhesus monkeys

▲ Figure 1.2 Bar charts showing the similarity between the findings of Hassett *et al.* (right) and a similar study conducted with human infants (left)

Conclusions   REVISED ☐

Toy preferences in both humans and monkeys are influenced by hormonal sex differences. These biological differences lead males and females to prefer different activities. Differing activity/play preferences lead to sex differences in cognition and behaviour.

Evaluation

▼ Table 1.5 Strengths and weaknesses of Hassett *et al.*

Strengths	Weaknesses
Reliability – the well-operationalised behavioural checklist meant behaviours were consistently coded in the same way.	**Objectivity** – the researchers who analysed the videotapes were very familiar with the monkeys, which could lead to observer bias.
Validity – use of unobtrusive video cameras meant that behaviour was likely to be more spontaneous and unaffected by human presence.	**Generalisations** – Eight of the 11 male monkeys were juveniles, and the only high-ranking male in the troop did not interact with any of the toys.

Issues and debates

Application to everyday life

» The findings may be helpful to people who design and market toys, as well as parents and other adults when buying toys for children.
» Empathy and language skills could be developed in boys through play with wheeled toys which have expressive faces.
» Visuospatial skills could be developed in girls using toys with moving parts that can be used to create a social situation, such as a school bus with dolls for the driver and children on board.

Nature versus nurture

» The findings support nature over nurture.
» Differences in toy preference result from hormonal differences between the sexes.
» Males showed stronger sex-typed toy preferences than females.
» Toy preferences were also affected by social rank. Role within the group also affected time spent interacting with toys. Sex was not the only important factor.

Use of children and animals in psychological research

» Conclusions from animals were extrapolated to children.
» Using animals allowed the researchers to control the environment, increasing validity.
» From a very early age, children start to learn about social norms for play and toy preferences based on gender (e.g. from advertising, observing their peers). Using animals allowed the researchers to examine the effect of biological factors (e.g. hormones) without the confounding variable of previous social and cultural experiences.

> ### SKILLS BUILDER
>
> *Fenella thinks the findings of Hassett* et al. *support the nature side of the nature–nurture debate, but her friend Meera is not so sure. Outline why you think either Fenella or Meera is correct, using evidence from the study.* [2]
>
> This type of question requires careful reading of both the stem (the sentence about Fenella and Meera) and the actual question. Focus on evidence to support *either* Fenella *or* Meera, but not both.

1.3 Hölzel *et al.* (mindfulness and brain scans)

> ### STUDY TIP
>
> Have you tried the Leitner technique? This technique relies on spaced repetition, an evidence-based strategy to improve knowledge retention. Watch online videos and check websites such as The Learning Scientists (http://learningscientists.org) to find out more. The technique involves revisiting material either daily, every other day or every week, depending on how well you remember it. You can use it to learn details, such as which brain structures increased or decreased in **grey matter concentration (GMC)** in this study.

▲ Figure 1.3 Mindfulness could be used to develop non-judgemental attitudes in the workplace, helping team members to work together more productively

Psychology being investigated

Mindfulness

» **Mindfulness** is a stress-reduction technique used to improve wellbeing through developing awareness of the present moment and encouraging compassionate, non-judgemental attitudes.
» Biological psychologists are uncertain how **Mindfulness-Based Stress Reduction (MBSR)** enhances wellbeing, but neuroimaging reveals which brain structures may be involved.

Localisation of function

» This is the idea that specific brain structures are responsible for specific behaviours/cognitive processes.
» This study used **magnetic resonance imaging (MRI)** and **voxel-based morphometry (VBM)** to examine which brain structures (e.g. hippocampus, insula) undergo structural plasticity (changes in neural tissue) following MBSR training.

Background

» Meditators have significantly more grey matter in the **hippocampus** and **insula** than non-meditators. For example, **functional magnetic resonance imaging (fMRI)** research found the hippocampus to be active during meditation.
» Changes in wellbeing may be linked to increases in **grey matter concentration (GMC)** following mindfulness/meditation practice.

Aims

1 To investigate changes in GMC following an eight-week MBSR programme.
2 To identify specific brain structures that undergo change following the eight-week MBSR programme.

Methodology

Research methods and design:

1 Longitudinal experiment with mixed design:
   – Repeated measures - brain scans were conducted at the beginning and end of an eight-week period.
   – Independent measures - findings from the MBSR group were compared with a no MBSR control group. (See page 58 to refresh your knowledge of experimental designs.)
2 Correlations: The researchers analysed the correlation between the amount of time that participants engaged in mindfulness practice (time in minutes) and increases in GMC.

Data collection techniques:

MRI:

» Scans were conducted two weeks before the first MBSR session and at the end of the eight-week training programme
» A 3D digital brain model was created for each participant, using 128 sagittal (top to bottom) images.

Self-reports:

» The *Five Facets of Mindfulness Questionnaire* (*FFMQ*) was used to measure 5 key aspects of mindfulness that have been found to be positively correlated with wellbeing.

» Participants rate 39 statements from 1 ('never or very rarely true') to 5 ('very often or always true').

Check your answers at **www.hoddereducation.com/cambridgeextras**

Variables:

Independent variables:

» MBSR: the experimental group (6 males, 10 females; mean age: 38) attended 2.5-hour weekly group meetings for eight weeks and one 6.5-hour training day.
  – Sessions included yoga, sitting meditation and body scanning (a relaxation technique).
» The control group (11 males, 6 females; mean age: 39) did not attend these meetings (independent measures) but were on a waiting list for future MBSR.
» MRI brain scans before and after the first MBSR session and at the end of the eight-week study period.

Dependent/co-variables:

» VBM (see page 15) was used to measure grey matter concentration throughout the brain, but specifically in the hippocampi and insulae (quantitative data).
» Mindfulness was measured using the FFMQ (quantitative data).

Additional co-variable: time spent on mindfulness exercises between training sessions (daily diaries used to collect self-reported data).

Sample:

Size: 33; experimental group: 6 males, 10 females; control group: 11 males, 6 females.

Demographic: right-handed, healthy adults, age 25–55, no regular medication, limited meditation experience.

Sampling technique: opportunity sample recruited from four MBSR courses held at a mindfulness centre in New England, USA; all were referred or self-referred for stress.

Overview of procedure

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» Stage 1: participants received MRI scans and completed the FFMQ two weeks before the first MBSR meeting.
» Stage 2: eight weeks of MBSR for the experimental group only, who were also given a 45-minute audio recording of mindfulness exercises to practise at home.
» Stage 3: participants received MRI scans and completed the FFMQ two weeks after the final MBSR meeting.

Controls

» Participant variables were controlled by:
  – using repeated measures design, i.e. testing the same people twice at the beginning and end of the study
  – checking that there were no significant differences between the two groups in terms of key variables, such as age and educational background.
» Order effects were controlled by using a 'no MBSR' control group to determine how much of the change in GMC at scan 2 was spontaneous/natural and how much was due to the independent variable (the MBSR programme).

Ethical issues

» Participants in the experimental group gave informed consent – agreeing to aim to participate in all meetings, complete 'homework' exercises and record duration in daily diaries.
» MBSR fees were reduced to thank all participants.
» Participants with claustrophobia and/or metallic implants were excluded to protect them from psychological and physical harm caused by the MRI scanner.

Results

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The average time spent on mindfulness exercises was:

» 27 minutes per day
» 22.6 hours over 8 weeks (SD = 6.3 hours)

▼ Table 1.6 Time (in minutes) spent on MBSR exercises over eight weeks

Mindfulness exercises	Mean	Standard deviation
Body scan	699	217
Yoga	327	194
Sitting meditation	332	211

Following MBSR training, the experimental group showed:

» significant improvement in three of the five facets of mindfulness: acting with awareness, observing and non-judging
» a significant increase in GMC in the:
  – left hippocampus
  – posterior cingulate cortex
  – temporoparietal junction
  – cerebellum

>> no significant correlation between GMC and time spent on mindfulness exercises or the five facets of mindfulness.

The control group showed:

>> no significant improvement in any of the five facets of mindfulness
>> a significant decrease in GMC in the posterior cingulate cortex.

Conclusions

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>> Regular mindfulness practice can lead to localised structural changes in grey matter concentration, in structures including the left hippocampus and posterior cingulate cortex.
>> Changes in these structures may underpin the wellbeing benefits of mindfulness, as they have been previously linked to learning, memory, emotion regulation and perspective-taking.
>> Previous research on the insulae was unconfirmed. Changes in this structure may take more than eight weeks.

Evaluation

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▼ Table 1.7 Strengths and weaknesses of Hölzel *et al.*

Strengths	Weaknesses
Reliability – the FFMQ is highly reliable. For example, the correlation between the eight questions on 'acting with awareness' was +0.87.	**Validity** – changes in GMC in the experimental groups may have resulted from increased social interaction at the MBSR group. This confounding variable was not controlled.
Objectivity – analysis of quantitative data from VBM is objective as it is conducted via computer software.	**Generalisations** – findings may not be representative of people older or younger than 25–55 or with fewer years of education.

Issues and debates

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Application to everyday life

Integration of regular opportunities for daily mindfulness in the workplace could lead to improved wellbeing. This may also lead to increased productivity and fewer days lost to ill health.

Nature versus nurture

The impact of both nature and nurture are supported.

>> Nature: localised increases in GMC were correlated with changes in three of the five facets of mindfulness.
>> Nurture: environmental experiences (e.g. MBSR group attendance) affect wellbeing.

▶ SKILLS BUILDER

Hölzel et al. *measured grey matter concentration throughout the brain before and after participation in an eight-week MBSR programme. Suggest one situational and one individual factor that could affect the extent to which participants in the experimental group experienced changes in grey matter concentration.* [4]

This book includes ideas to help you to think about how the issues and debates at AS Level can be applied to each of the 12 studies. However, you may sometimes be faced with a question on an issue/debate which has not been covered. These questions can be fun as they offer an opportunity to

think creatively rather than scour your memory for missing facts.

Individual factors relate to the person. They are characteristics or traits that may lead the person to perform differently from others who do not possess that characteristic or trait. Situational factors relate to the circumstances or context in which a person's behaviour is observed. For example, a person's age may influence changes in GMC (individual factor). Furthermore, environmental stressors, such as noise or overcrowding in the setting in which mindfulness is practised, may decrease the extent of GMC change (situational factor).

Biological approach revision checklist

	Dement and Kleitman (sleep and dreams)	Hassett *et al.* (monkey toy preferences)	Hölzel *et al.* (mindfulness and brain scans)
Explain links to the assumptions of the Biological approach			
Define all the key words from the psychology being investigated (see online glossary)			
Describe the background			
Describe the aim			
State and evaluate the research method(s)			
State and evaluate the technique used for data collection (if different from the method)			
Describe and evaluate the sample (e.g. size, demographic and/or sampling technique)			
State and evaluate the experimental design (if relevant)			
State the manipulated and measured (co-)variables (if relevant) and evaluate how these were operationalised			
State at least two controls (if relevant) and evaluate the effect of these controls on the findings			
State and evaluate the type of questions used (if relevant)			
Describe and evaluate the procedure			
Explain at least two ethical issues and discuss how these affected the study			
Describe three to four quantitative findings			
Describe at least two qualitative findings (if relevant)			
Explain how the results were presented			
Explain how the results are/could be interpreted and how they relate to one or more of the assumptions of the approach			
Describe one or more conclusion(s)			
Identify two strengths that be could discussed in a ten-mark extended response question			
Identify two weaknesses that be could discussed in a ten-mark extended response question			
Identify two applications to everyday life			
Explain how the study links to the debate about individual and situational explanations			
Explain how the study links to the debate about nature versus nurture			
Explain how the study links to the issue of the use of children/animals in psychological research			

Check your answers at **www.hoddereducation.com/cambridgeextras**

2 The Cognitive approach

The main assumptions

Cognitive psychologists assume that:

1 Information is processed through the same route in all humans: input – process – output, in a similar way to how information is processed by a computer.
2 People have individual differences in their cognitive processing, such as attention, language, thinking and memory. These processes can also help to explain behaviour and emotion.

(Cambridge International, 2021)

2.1 Andrade (doodling)

Psychology being investigated

Memory

Memory is:

» the encoding, storage and retrieval of information, including sights, sounds and smells
» the process of retaining this information over a long period of time.

Incidental memory is the memory of information you have not been asked to remember/are not focused on. Information is therefore remembered unintentionally.

Attention

Attention is the process of focusing on a particular piece of information or task.

» There is a limit to how much information we can process at any one time, so we are selective in which information we focus on.
» Selective attention is the process of focusing/concentrating on information that is important while blocking out irrelevant information.

> **STUDY TIP**
>
> Andrade's study uses several important key terms for example, **incidental memory** and monitoring accuracy. Create a matching game in which you have to match key terms to their definitions. Write the terms and definitions onto squares of paper, mix them up and see if you can put the pairs back together.

Background

» **Doodling** may impair performance by moving **concentration** away from the primary task.
» However, doodling may help us to concentrate *better*:
  – especially on tasks that are not very interesting (i.e. low arousal)
  – by increasing arousal and alertness and reducing daydreaming, which decreases concentration on a task.

Aims

1 To investigate whether doodling while listening improves attention/concentration.
2 To investigate whether doodling while listening improves recall.

Methodology

Research method and design: laboratory experiment with an independent measures design and random allocation.

Data collection techniques:

» Monitoring task: Participants listened to a pretend telephone message about a party, including names of people and places (see below).
  – They had to pay attention and write down the names of people who were able to attend the party (monitored information).
» A surprise memory test.

Variables:

Independent variable: whether the participants were allowed to doodle (shading lines of shapes on A4 paper) or not while listening to the pretend telephone message.

Dependent variable(s):

» Monitoring
  – accuracy: number of correct names (out of eight)
  – performance: correct names minus false alarms (wrong answers).
» Memory for:
  – monitored information: number of correct names recalled (out of eight) after false alarms were deducted
  – incidental information: number of correct places recalled (out of eight).

Sample:

Size: 40 (35 women and 5 men); doodling condition: 20; control condition: 20.

Demographic: 18–55-year-olds; members of the University of Plymouth participant panel.

Sampling technique: opportunity; participants had just finished another experiment. Researchers asked whether they would stay to complete another study hoping that this would increase the likelihood of boredom.

Overview of procedure

» Participants sat alone in a quiet, dull room and were given a sheet a A4 paper. This was either:
  – printed with rows of shapes to shade (the experimental group).
  – lined with no shapes to shade (the control group).
» They were asked to listen to a 2.5-minute audio recording of a pretend telephone message
» The message mentioned:
  – eight people who would be at the party
  – three people and a cat who could not come, called 'lures'
  – eight place names
  – a lot of irrelevant information.
» Both groups had to write down the names of the people coming to the party on the A4 paper.
» One minute after listening to the tape, there was a surprise memory test. Participants had to write down:
  – the names of the party-goers
  – the place names.

Controls

All participants:

» heard the same 2.5-minute tape in the same room
» were given standardised instructions before listening to the tape.

Half the participants recalled the names first and the other half recalled places first (counterbalancing) to avoid order effects. (Revise order effects and counterbalancing on page 59.)

SKILLS BUILDER

Outline why doodling may help people to concentrate on a task. [2]

You could start by talking about how doodling inhibits (reduces) daydreaming. Then in the second sentence you could talk about how this improves performance by increasing arousal levels and alertness, meaning we are able to concentrate better on the task.

NOW TEST YOURSELF

2.1 Outline one difference between monitored and incidental information, with an example from this study. [2]

2.2 Describe how quantitative data was gathered in this study. [2]

2.3 Outline one disadvantage of the way that doodling was operationalised in this study. [2]

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Check your answers at **www.hoddereducation.com/cambridgeextras**

Copyright: Sample Material

Ethical issues

» Deception: Participants were told that they did not need to remember anything on the tape, which was not true.
» Informed consent could not, therefore, be given.

> **SKILLS BUILDER**
>
> *Suggest one strength of using counterbalancing during the surprise memory test.* [2]
>
> The command term 'suggest' requires you to present ideas or considerations based on your knowledge and understanding of psychology. Think about a possible strength of using counterbalancing
>
> in Andrade's study. For example, first, you could identify the strength (e.g. controlling order effects) and second, link it back to the study/surprise memory test. When you link back to the study, you may explain how counterbalancing would help improve the validity of the specific findings of this study, which is about doodling and memory.

Results

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Monitoring accuracy

▼ Table 2.1 Number of correct names recorded and number of false alarms

	Number of names accurately recalled		Number of people scoring full marks (8/8)	Number of people making false alarms
	Mean	**Standard deviation**		
Doodlers (experimental group)	7.8	0.4	15/20	1
Non-doodlers (control)	7.1	1.1	9/20	5

▼ Table 2.2 Monitoring performance score (correct names remembered minus number of false alarms)

	Monitoring performance score (maximum score = 8)	
	Mean	**Standard deviation**
Doodlers (experimental group)	7.7	0.6
Non-doodlers (control)	6.9	1.3

Recall performance

» Total recall (monitored and incidental information: max 16) for doodlers was 29 per cent higher (7.5) than for the control group (5.8).
» Doodlers remembered both types of information better than the control group.
» Both groups remembered monitored information better than incidental information.
» The average number of false alarms was low (0.3) for both groups.

Conclusions

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» Doodling improves concentration during boring listening tasks.
» Doodling improves memory, even for information we have not intentionally tried to store.

Evaluation

▼ Table 2.3 Strengths and weaknesses of Andrade

Strengths	Weaknesses
Reliability – highly standardised procedure which can be replicated easily to test for reliability. For example, all participants listened to the same tape, in the same room, and they were given standardised instructions.	**Objectivity** – misheard words (e.g. writing Greg instead of Craig) were counted as correct. The assumption that words have been 'misheard' rather than being incorrect makes the coding of answers subjective.
Validity – Andrade checked whether any participants had detected the deception. A total of 18 per cent said that they had. The data was re-analysed without their scores, and the results were the same.	**Generalisations** – there were more females (87.5 per cent) than males (12.5 per cent), meaning that the findings should be generalised to males with caution.

Issues and debates

Individual and situational explanations

The study shows that:

» attention/memory is affected by situational factors, such as being able to doodle
» cognitive performance is not always fixed and stable
» that parents/teachers/employers need to be aware that small changes in a situation can improve people's performance.

Application to everyday life

» Benefits of doodling should be communicated to employers/teachers, etc.
» It should not be assumed that people who doodle in classes/meetings are not concentrating.
» People who find it hard to concentrate could be offered paper to doodle. This could improve their concentration on dull tasks.

> ### ► SKILLS BUILDER
>
> *Penny is a manager at a local company. Her employees are struggling to concentrate in work meetings. Outline how the results of the study by Andrade could be applied to Penny's company to help employees to concentrate.* [2]
>
> The command term 'outline' means you do not need to go into great detail within your answer. Show your knowledge of the results of Andrade's study and
>
> then how this can be applied to Penny's company. You could talk about any result in the study, as long as you make it relevant to Penny and her employees. However, the results from the 'monitoring' part of the study are the most relevant to concentration. For example, Penny could provide paper and coloured pens in meetings to encourage doodling, as this could help the employees to focus more on what people are saying, but only if the meeting is boring.

2.2 Baron-Cohen *et al.* (eyes test)

Psychology being investigated

Theory of mind

» **Theory of mind** is the ability to determine the mental state of ourselves and other people.
» It is linked to **social sensitivity** and the ability to understand other people's opinions or views.
» There are two stages:
  – What? Identifying a person's mental state. For example, 'He feels sad … '
  – Why? Understanding the context of that mental state. For example, ' … because he lost his ball'.

Check your answers at **www.hoddereducation.com/cambridgeextras**

» People with **autism** spectrum disorders often do not have a fully developed theory of mind. This is called a a theory of mind deficit.

Social sensitivity

» Social sensitivity is the ability to identify and understand social cues and contexts when interacting with others.
» It refers to how well you can understand other people's feelings.

Background

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Measuring cognitive dysfunction

» It is difficult to develop tests that are sensitive enough to detect cognitive dysfunction, especially for adults with typical intelligence but impaired social understanding.
» Therefore, most tests are developed for children.

The original 'Reading the Mind in the Eyes' test

» This was a test for adult social sensitivity/theory of mind.
» It included 25 photographs of eyes of famous actors.
» Participants selected one of two words to best describe how the person in the photograph was feeling.
» Adults with high functioning autism (HFA) or **Asperger syndrome** (AS) scored significantly lower than matched controls.

> **STUDY TIP**
>
> To better understand the evaluation points for this study, why not take the eyes test yourself. There are many websites where you can try it, such as **https://docs. autismresearchcentre. com/tests/adult_part1. pdf.** When completing the test, think about how it could be improved.

▼ Table 2.4 Problems with the original eyes test

Problems with the original *Eyes Test*	Solutions in the *Revised Eyes Test*
Each item had only two possible answers; a score of 68 per cent or more was needed to be higher than chance alone.	Increased number of items from 25 to 36; increased number of possible answers from two to four.
Basic mental states were used (e.g. happy, angry); even very young children can identify these states.	Only included complex mental states (e.g. contempt).
Eye direction could be used to identify some mental states (e.g. noticing).	These were not included in the new test.
More female than male faces were included.	The same number of male and female faces were used.
The correct and incorrect (foil) answer options were opposites, such as sad versus happy, which was too easy.	Similarity between the target word and the three foils was increased, making it more difficult.
Words may not have been understood.	The test was presented with a glossary.

Aims

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1 To investigate whether scores on the *Autism Quotient* (*AQ*) and the *Revised Eyes Test* scores are negatively correlated.
2 To trial the *Revised Eyes Test* with adults with high-functioning autism and Asperger syndrome as shown in Table 2.5.

▼ Table 2.5 Aims of Baron-Cohen *et al.*

Participants	To investigate whether...	
Adults with high-functioning autism (HFA)/Asperger syndrome (AS)	**2.1**	they score lower on the eyes test than other groups, as with the previous version of the test
	2.2	they score higher on the *AQ* than other groups
Neurotypical adults	**2.3**	females score higher than males on the *Revised Eyes Test*
	2.4	males score lower than females on the *Revised Eyes Test* and higher than females on the *AQ*

Methodology

Research method and design: experiment with an independent measures design; correlation. (Revise the difference between experiment and correlation on pages 69 and 70.)

Data collection techniques:

» Questionnaire: the *AQ* test – 50 closed questions, answered on four-point rating scales. (Revise questionnaires on page 61.)
» The *Revised Eyes Test*: 36 black and white photographs of eyes with four possible answers.

Variables:

Independent variables – whether the participants:

» had HFA/AS or not
» were male or female.

Dependent variable/co-variable: test scores on the *Revised Eyes Test* and the *AQ*.

Sample:

▼ Table 2.6 Sample in Baron-Cohen *et al.*

	Group 1: HFA/AS adults	Group 2: general population controls	Group 3: students	Group 4: IQ matched controls
Size	15	122	103	14
Demographics	Male adults with HFA/AS from the United Kingdom; socioeconomic class and educational background similar to Group 2	Neurotypical adults from the United Kingdom; wide range of occupations/ socioeconomic classes and education backgrounds	53 males and 50 females; neurotypical undergraduate students; high IQ as from a highly selective university	General population; matched on IQ to Group 1
Sampling technique	Volunteer sample; adverts placed in the National Autistic Society (NAS) magazine and at support groups	Opportunity sample from community and education classes and libraries	Opportunity sample from Cambridge University, United Kingdom	Random sample

Overview of procedure

Eye test development
» The first draft was trialled with eight independent 'judges'.
» Items were accepted if the target word was selected by five of the eight judges.
» Items were rejected if the same foil was picked by more than two judges.

» Next, the test was trialled on Groups 2 and 3. Items were accepted if 50 per cent (of the 225 participants) selected the target word and no more than 25 per cent picked the same foil.
» Four items were rejected, leaving 36 items on the *Revised Eyes Test*.

The *Revised Eyes Test*

» Participants took the *Revised Eyes Test* individually in a quiet room.
» Groups 1, 3 and 4 completed the *AQ*.
» Group 1 (HFA/AS) also identified the gender of the people in the photographs.
» Participants could refer to the glossary to clarify word meanings.

Controls

» The same tests were taken in the same way (quiet conditions with glossary).
» All items in the *Revised Eyes Test* were the same size, in black and white, with four options and three foils.

Ethical issues

Psychological harm:

» A lack of understanding of the words/emotions may cause distress/embarrassment.
» People in Groups 2–4 who received extreme scores may need referral for more detailed assessment, especially for those with HFA/AS.

▶ SKILLS BUILDER

For the study by Baron-Cohen et al., *outline how two results support the aims of this study.* [4]

To answer 'how' the results link to the aims, choose one result and briefly describe it. Then link it back to the aims made by Baron-Cohen *et al.* As you are asked about two results, you need to do this twice. In this section, the aims and results are numbered. This is to make it easier for you to link each result to the relevant aim/part of an aim. It is worth revising in this way so you do not get them mixed up.

▶ NOW TEST YOURSELF

2.4 Describe how Baron-Cohen *et al.* chose the target words and foils for the *Revised Eyes Test*. [4]
2.5 The research methods used in the study by Baron-Cohen *et al.* included experiments and correlations. Outline what is meant by a correlation giving an example from this study. [3]
2.6 Give one advantage of the use of a questionnaire as a way of collecting the data in this study. [2]

Results

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1 There was a negative correlation between the *AQ* scores and the *Revised Eyes Test* scores (−0.53) for all three groups.
2 2.1 Group 1 performed significantly lower on the *Revised Eyes Test* than other groups. There were no impairments in the gender recognition task.
  2.2 Group 1 scored significantly higher than Groups 3 and 4 on the *AQ*.
  2.3 Although not significant, females scored higher than males on the *Revised Eyes Test*.
  2.4 Males scored higher on the *AQ* than females.

Conclusions

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The *Revised Eyes Test*:

» is a more sensitive test for social intelligence than the original *Eyes Test*
» can be used as a measure of severity of autistic traits due to the negative correlation with the *AQ*.

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