



Oxford Cambridge and RSA

Thursday 14 October 2021 – Morning

A Level Psychology

H567/03 Applied psychology

Time allowed: 2 hours



You must have:

- the OCR 12-page Answer Booklet

INSTRUCTIONS

- Use black ink.
- Write your answer to each question in the Answer Booklet. The question numbers must be clearly shown.
- Fill in the boxes on the front of the Answer Booklet.
- Answer **all** the questions in Section A.
- Choose **two** options in Section B and answer all the parts of the question for each option.

INFORMATION

- The total mark for this paper is **105**.
- The marks for each question are shown in brackets [].
- Quality of extended response will be assessed in questions marked with an asterisk (*).
- This document has **4** pages.

ADVICE

- Try to answer every part of each question you choose.
- Read each question carefully before you start your answer.

SECTION A: Issues in mental health

Answer **all** the questions in Section A.

- 1 Ali is behaving in a way that people regard as strange. Whatever events happen in Ali's life, they do not seem to affect Ali's mood at all. Ali remains constantly happy and excited.
 - (a) How might **one** of the historical views of mental illness explain Ali's behaviour? [4]
 - (b) Outline **one** way the medical model might explain Ali's behaviour. [4]
 - (c) How might **one** of the alternatives to the medical model explain Ali's behaviour? [4]
- 2 The key research by Rosenhan (1973) reports that mental hospital staff "delivered verbal and occasionally serious physical abuse to patients" in front of other patients. However, when other members of staff were known to be coming, this abuse was quickly stopped.
 - (a) How did Rosenhan explain the behaviour of the abusive staff? [3]
 - (b) Describe **two** ways in which the key research by Rosenhan (1973) could have been improved. [6]
- 3 Compare the characteristics of an affective disorder with the characteristics of a psychotic disorder. [8]
- 4 Discuss ethical considerations concerning non-biological treatment of one specific mental disorder. [6]

SECTION B: Options

Choose **two** options and answer **all** parts of the question in the options you have chosen.

OPTION 1

Child psychology

- 5 (a)* Outline the key research by Van Leeuwen et al. (2008) and use it to explain what psychologists mean by intelligence. [10]
- (b)* Discuss the social sensitivity of conducting research into intelligence. [15]
- (c)* Azmi is head of Key Stage 4 in school, meaning they are responsible for children aged 14–16 years. Azmi wants to motivate the children by getting them to see how much potential they've got. Azmi believes that intelligence tests could help to show the children their true levels of ability.
- Outline at least **one** method of assessing intelligence a psychologist might advise Azmi to use with the children. [10]

OPTION 2

Criminal psychology

- 6 (a)* Outline the key research by Memon and Higham (1999) and explain how it could help the police in the collection of evidence from witnesses. [10]
- (b)* Discuss the individual/situational explanations debate in relation to collection of evidence. [15]
- (c)* Alex is a police officer working in the UK. They are investigating an incident in which a woman standing in a queue in a coffee shop had her mobile phone stolen. Alex is preparing to interview the man suspected of having committed this crime.
- Outline at least **one** strategy a psychologist might advise Alex to use when interviewing this man. [10]

OPTION 3

Environmental psychology

- 7 (a)* Outline the key research by Lord (1994) and explain what it tells us about factors that influence recycling behaviour. [10]

- (b)* Discuss the freewill/determinism debate in relation to research into recycling and other conservation behaviours. [15]

- (c)* Kai works for the local Council as an environmental officer. Kai is concerned that residents are being wasteful in their use of water. Kai would like them to turn taps off when brushing their teeth. Kai would also like them to have showers instead of baths.

Outline at least **one** technique a psychologist might advise Kai to use to get people using less water. [10]

OPTION 4

Sport and exercise psychology

- 8 (a)* Outline the key research by Zajonc et al. (1969) and use it to explain how an audience can affect sports performance. [10]

- (b)* Discuss whether research into audience effects is scientific. [15]

- (c)* For many months, a football team has been playing its matches in an empty stadium. With no supporters watching them, they did better than when supporters had been present. The team is due to start playing in front of supporters again from their next match onwards. Ahmet, who coaches them, is keen to ensure that the players maintain their good standard of performance.

Outline at least **one** strategy a sports psychologist might suggest to Ahmet for how to prepare the players for this match. [10]

END OF QUESTION PAPER

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- 1(a) One historical view of mental illness is Hippocrates' theory of the four humours. The body was thought to contain four fluids (blood, phlegm, yellow bile and black bile) and good mental health depended on these being in balance. An excess of one humour produced a particular temperament, so too much blood made a person sanguine, meaning cheerful, excitable and over-optimistic. This view would explain Ali's behaviour as the result of an excess of blood. Because Ali's humours are out of balance, Ali remains constantly happy and excited whatever happens, and the mood does not change with events because the imbalance, not the events, is driving the mood. Treatment would have aimed to restore balance, for example by bloodletting.
- 1(b) The medical model sees mental illness as a physical illness with a biological cause, and one explanation is the biochemical explanation. This states that abnormal behaviour is caused by too much or too little of a neurotransmitter in the brain. Mania and elevated mood have been linked to excessive levels of the neurotransmitters dopamine and noradrenaline, and to abnormal serotonin activity, which affect the brain's reward and arousal systems. The medical model would therefore explain Ali's behaviour by saying Ali has an imbalance of these chemicals, with over-activity of dopamine and noradrenaline producing the constant happiness and excitement. Because the cause is chemical rather than a reaction to life events, Ali's mood stays high regardless of what happens, and a drug such as lithium or an antipsychotic would be used to correct the imbalance.
- 1(c) One alternative to the medical model is the behaviourist explanation, which argues that all behaviour, including abnormal behaviour, is learned through classical conditioning, operant conditioning and social learning. The behaviourist would explain Ali's behaviour through operant conditioning. When Ali behaved in a happy and excited way in the past, this was positively reinforced, for example by attention, praise and approval from family and friends, so the behaviour became more frequent and stronger. Ali may also have observed and imitated a happy, excitable role model who was rewarded for behaving that way. Because the happy

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behaviour has been so consistently reinforced, it is now shown in every situation, which is why Ali's mood does not change with events. Treatment would involve changing the reinforcement so that more appropriate emotional responses are rewarded.

2(a) Rosenhan explained the abuse in terms of the powerlessness and depersonalisation of the patients. Staff were in a position of power and, because the patients had been labelled as mentally ill, they were not seen as equals or as fully human, so abuse was treated as acceptable. The label also meant that anything a patient said would be interpreted as a symptom of illness, so patients were not credible witnesses and staff could abuse them freely. When another member of staff was known to be coming the abuse stopped, because a fellow professional was a credible witness who would be believed and could report the behaviour, whereas a patient's complaint would simply be dismissed as part of their madness.

2(b) One improvement would be to use a larger and more varied sample of hospitals. Rosenhan used 12 hospitals, all in the USA, so the findings about misdiagnosis and poor treatment may only reflect the American system in the early 1970s. Sending pseudopatients to hospitals in several different countries, including state and private hospitals, would improve the population validity and make it possible to generalise the conclusion that psychiatric diagnosis is unreliable. A second improvement would be to vary the symptoms and the characteristics of the pseudopatients. All eight pseudopatients reported the same single symptom of hearing voices saying "empty", "hollow" and "thud", and almost all were white, middle-class professionals. By having pseudopatients present with different sets of symptoms, and systematically varying their age, gender and ethnicity, Rosenhan could have tested whether misdiagnosis depends on the symptom presented or on the characteristics of the person being diagnosed, giving a more complete picture of the validity of diagnosis.

3 One difference between the two types of disorder is contact with reality. A psychotic disorder

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such as schizophrenia involves a loss of contact with reality; positive symptoms include hallucinations, such as hearing voices that are not there, and delusions, such as believing one is being persecuted or has special powers, along with disorganised speech and thinking. In an affective disorder such as major depression the person usually keeps contact with reality; the core characteristics are a persistently low or flattened mood, loss of interest and pleasure, feelings of worthlessness and recurrent thoughts of death, rather than false beliefs or perceptions. This matters because a person with depression normally has insight into their condition and can describe their symptoms, while a person experiencing psychosis may not recognise that they are ill.

A similarity is that both disorders disrupt everyday functioning and share some physical and cognitive characteristics. The DSM-5 lists disturbed sleep, change in appetite or weight, loss of energy and poor concentration as symptoms of depression, and schizophrenia's negative symptoms include avolition, flattened affect, social withdrawal and sleep disturbance, so both can involve withdrawal, lack of motivation and reduced concentration. Both also require symptoms to last for a set period (two weeks for depression, six months for schizophrenia) and to cause significant impairment before a diagnosis is made. Overall, the disorders differ most in the presence of psychotic symptoms but overlap in their effects on sleep, energy and motivation, which is one reason negative symptoms of schizophrenia are sometimes confused with depression.

- 4 Ethical considerations are the moral issues raised by treating people, such as protection from harm, informed consent, the right to withdraw and whether the benefits justify the costs. I will discuss these in relation to non-biological treatment of phobias. Systematic desensitisation is relatively ethical because the client builds the anxiety hierarchy with the therapist and controls the pace, giving genuine consent and the chance to withdraw at each step, and relaxation keeps distress low. Flooding is more ethically questionable because the client is exposed to the feared object at full intensity for a prolonged time, which causes extreme

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distress and could be psychologically harmful; a client who panics may also feel unable to withdraw, so consent must be fully informed about the discomfort involved. However, it can be argued that the end justifies the means: flooding is quick and effective, so a short period of distress removes a phobia that may have restricted the person's life for years, and arguably it is more ethical than leaving someone untreated or relying on drugs that only mask symptoms. Overall, non-biological treatments for phobias can be defended ethically provided consent is informed, distress is minimised where possible and the client's welfare is monitored throughout.

5(a) Van Leeuwen et al. (2008) conducted a twin-family study in the Netherlands to investigate the extent to which general intelligence is inherited. The sample was 112 families recruited from the Netherlands Twin Register, each with a pair of nine-year-old twins (both monozygotic and dizygotic pairs), an older sibling where possible and the parents, giving over 400 participants in total. Every participant was tested individually: the children completed Raven's Standard Progressive Matrices and the parents completed Raven's Advanced Progressive Matrices, in both cases choosing which of several geometric patterns correctly completes a matrix. Zygosity was confirmed from DNA. Because the researchers had data from twins, siblings and parents they could use structural equation modelling to separate the effects of genes, shared environment, assortative mating and cultural transmission. They found that correlations in Raven's scores were much higher for MZ twins than for DZ twins or siblings, and estimated that about 67% of the variance in children's IQ was due to genetic factors. There was phenotypic assortment, meaning parents with similar intelligence tended to pair up, but no evidence of cultural transmission from parents to children. There was also a genotype-environment interaction: the environment had a greater influence on IQ in children with a low genetic predisposition.

The study shows what psychologists mean by intelligence in several ways. First, intelligence is treated as a measurable construct, a general ability (g) that can be quantified by a

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standardised test and compared across people and families. Second, the choice of the Raven's matrices shows that intelligence is seen as a cognitive process, the capacity to form comparisons and reason by analogy, which is why the test uses abstract patterns rather than learned facts or words, so it is largely culture- and language-free and taps fluid rather than crystallised intelligence. Third, the design and results show that intelligence is seen as having both innate and environmental sources: largely heritable, but still shaped by the environment, especially for those with lower genetic potential. Finally, the use of different versions for children and adults shows intelligence is seen as developing with age.

5(b) Socially sensitive research is research where the findings or the questions asked have potential consequences for the participants or for the wider group they represent, for example by supporting prejudice, affecting social policy or changing how a group is treated. Sieber and Stanley identified the research question, the treatment of participants and the use of findings as points where sensitivity arises. Research into intelligence is one of the most socially sensitive areas in psychology, and I will discuss why, and whether it can be defended. One reason it is sensitive is that findings about genetic influence can be used to justify discrimination. Van Leeuwen et al. (2008) estimated that around 67% of the variance in children's IQ is genetic. Although their sample was Dutch families and the findings say nothing about differences between ethnic groups, such heritability figures have historically been misused, for example Yerkes' army tests being used to argue that southern and eastern European immigrants were less intelligent and to shape US immigration law, and Herrnstein and Murray's claims in The Bell Curve. If intelligence is seen as fixed and inherited, low scorers, or groups who score lower on average, may be labelled as incapable and offered fewer opportunities, so the research has consequences far beyond the laboratory. A second issue is the impact on the test-takers themselves. Receiving a low IQ score can reduce self-esteem and create a self-fulfilling prophecy, as Rosenthal and Jacobson showed when teachers' expectations based on supposed test results changed children's later

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performance. Children in Van Leeuwen's study were only nine years old, and being told, or having parents told, that a child has low ability could change how that child is treated at home and school. Researchers therefore need to think carefully about feedback and confidentiality.

A third issue is the cultural bias of the tests. Even Raven's matrices, chosen because they are non-verbal, assume familiarity with abstract puzzles and test-taking, so differences in scores may reflect education and culture rather than innate ability. Publishing group differences without this caveat risks reinforcing stereotypes about gender, class or ethnicity.

However, the research can be defended. Van Leeuwen et al. actually found that the environment had a larger effect on children with lower genetic potential, which supports investing in enrichment and education rather than writing children off. Measuring intelligence allows children with learning difficulties to be identified and supported, and refusing to study intelligence would leave the field to prejudice rather than evidence. The problem is less the research itself than how findings are communicated and used.

In conclusion, research into intelligence is highly socially sensitive because of its history of misuse, its effect on labelling and self-esteem, and the cultural bias of the tests. It should still be conducted, but with careful sampling, cautious reporting of heritability figures and attention to how results are fed back to participants.

- 5(c) A psychologist would advise Azmi to use a standardised intelligence test that is suitable for 14 to 16 year olds and gives each child a clear profile of ability rather than a single pass or fail. One suitable method is Raven's Standard Progressive Matrices, the test Van Leeuwen et al. (2008) used with children. Each child would be given a booklet of 60 matrices arranged in five sets of increasing difficulty; in each item a geometric pattern has a piece missing and the child chooses which of six or eight options completes it. It can be given to a whole class at once in about 45 minutes, which is practical for a Key Stage 4 cohort, and because it is non-verbal it measures fluid reasoning rather than vocabulary, so pupils with weaker English or

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less academic knowledge are not disadvantaged. Scores are converted to percentiles using age norms, so each child can see how their reasoning ability compares with other 14 to 16 year olds, which fits Azmi's aim of showing children their true potential, particularly where a pupil's class grades are lower than their reasoning ability suggests.

I would also advise supplementing this with an individually administered test such as the Wechsler Intelligence Scale for Children (WISC-V), at least for pupils whose results are surprising. The WISC gives a full-scale IQ plus separate index scores for verbal comprehension, visual-spatial ability, fluid reasoning, working memory and processing speed. This profile is motivating because it shows every child specific strengths, for example a pupil with an average overall score may have a high working memory score, and highlights where support is needed. Because intelligence research is socially sensitive, the psychologist would advise Azmi to feed results back privately and positively, framing them as current ability that can grow, since Van Leeuwen et al. found environment still influences IQ and labelling can create a self-fulfilling prophecy. Azmi could also use a multiple intelligences questionnaire based on Gardner's theory so that pupils strong in musical, bodily-kinaesthetic or interpersonal intelligence also see their potential.

- 6(a) Memon and Higham (1999) carried out a review of research into the cognitive interview (CI), a technique developed by Geiselman and Fisher to improve witness recall. The CI uses four components: mental reinstatement of the context of the event, reporting everything even if it seems unimportant, recalling the event in a different order, and recalling it from a different perspective. The enhanced CI added rapport building, witness-compatible questioning and transfer of control to the witness. Memon and Higham organised their review around four themes. First, the effectiveness of the individual components: they found that context reinstatement and report everything were the most effective, whereas change perspective was the least used and least useful and could encourage witnesses to speculate. Second, the choice of comparison group: many studies compared the CI with a standard police interview, but*

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because standard interviews are often poor this exaggerates the CI's advantage; the structured interview, which includes the same communication skills but not the memory techniques, is a better control. Third, how memory performance is measured: studies report the number of correct details, errors and confabulations, and Memon and Higham argued that accuracy rates and the confidence and completeness of recall should be considered, not just quantity. Fourth, training: they found that brief training, such as a single four-hour session, had little effect and that interviewers need at least two days of training with feedback, and need to be motivated to use the technique. Overall the CI increases correct recall but can slightly increase errors.

This review could help the police collect evidence from witnesses in several ways. Officers should be trained to use context reinstatement, for example asking the witness to picture the scene, the weather and how they felt, and to report everything, since these components reliably produce more correct details. The change perspective instruction could be dropped or used cautiously because it risks confabulation and can confuse witnesses, so police should be selective rather than mechanically applying all four parts. Forces should invest in proper two-day training with practice and feedback, and only use trained, motivated interviewers for serious cases. Finally, the review reminds police that more information is not automatically better, so statements gathered with the CI should be checked against other evidence given the small rise in errors.

6(b) The individual/situational debate asks whether behaviour is best explained by factors within the person, such as personality, ability or experience, or by features of the situation they are in. In the collection of evidence this translates into whether the quality of evidence from witnesses, suspects and forensic material depends on the situation created by the police or on the individuals involved.

Much of the research takes a situational position. Memon and Higham (1999) reviewed the cognitive interview and concluded that the interview technique itself changes what a witness

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recalls: components such as context reinstatement and report everything increase correct details compared with a standard interview. The implication is that the witness's memory is a product of the situation the interviewer creates, which is a strength because it means poor evidence can be improved by changing procedures and training, a practical, optimistic conclusion. Similarly Dror et al. (2006) showed that fingerprint experts changed their judgements about prints they had previously matched when given biasing contextual information such as being told the suspect had confessed. This is a clear situational effect on supposedly objective forensic evidence and led to procedures that shield examiners from case details. Research into interrogation also treats the situation as key: the pressure of Reid's nine steps of interrogation can produce false confessions from innocent suspects, which is why the UK adopted the PEACE model.

However, individual factors cannot be ignored. Memon and Higham noted that the success of the CI depends on the interviewer: officers who were poorly trained, inexperienced or unmotivated did not gain the benefits, so the person collecting the evidence matters.

Individual differences in the witness or suspect also matter; a suspect who is young, has a learning disability or is highly compliant is far more likely to confess falsely under the same pressure than a hardened, experienced suspect, and in Dror's study one of the five experts did not change their decision. A purely situational account therefore cannot explain why the same procedure produces different results with different people, which limits the predictive validity of situational research.

A strength of the situational approach is that it is based on controlled experiments and large reviews, so it is scientific and leads to clear policy changes. A weakness is that it can be reductionist and appear to excuse individuals, such as biased examiners, from responsibility.

Individual explanations have the opposite problem: they are harder to act on, because the police cannot easily change a witness's personality, although they can screen vulnerable suspects.

In conclusion, the evidence suggests an interactionist position. Situational factors such as

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interview technique and contextual bias have the largest and most controllable effects on the collection of evidence, but individual characteristics of the interviewer and the interviewee determine how strongly those situational factors operate, so the best practice is to design good situations and also train and select the right people.

6(c) A psychologist would advise Alex to interview the suspect using the PEACE model, which is the ethical, non-coercive framework used by UK police and is appropriate because the man is only a suspect, not a confirmed offender. In the Planning and preparation stage Alex should review the evidence, such as the coffee shop CCTV and the woman's description, and set clear aims for the interview. In the Engage and explain stage Alex should build rapport, explain the purpose of the interview and the suspect's rights, and make clear he can speak freely; this reduces anxiety, which matters because anxious suspects are more likely to give unreliable accounts. In the Account stage Alex should ask the man for a free, uninterrupted account of where he was and what he did at the time of the theft, using open questions such as "Tell me what happened when you went into the coffee shop" and then probing for detail. Alex must avoid leading or closed questions and should not reveal case details prematurely, so that any knowledge the suspect shows is genuinely his own. Alex can then challenge inconsistencies calmly against the evidence. Closure involves summarising the account and allowing the man to correct it, and Evaluation means reviewing what was learned. The rationale is that PEACE gathers information rather than pressing for a confession. Research into the Reid technique and Kassin's work on false confessions shows that confrontational, minimisation and maximisation tactics increase the risk of false confessions, especially from vulnerable or compliant suspects, and such a confession would be inadmissible in a UK court. The psychologist would also advise Alex to borrow components of the cognitive interview supported by Memon and Higham (1999), such as asking the suspect to mentally reinstate the context of the queue and report everything, because these increase accurate detail which can then be checked against CCTV and witness statements. Finally, Alex should

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be cautious about relying on lie detection from body language, since cues such as fidgeting are unreliable, and should instead look for inconsistencies between the account and the physical evidence.

7(a) Lord (1994) investigated how the way a persuasive message is framed and who delivers it affects attitudes to recycling and actual recycling behaviour. The participants were 140 households in a suburban area of a city in upstate New York that had a kerbside recycling scheme. Students acting as research assistants chose households they knew personally. The study was a field experiment with an independent measures design using a 2 x 3 structure: messages were either positively framed, stressing the benefits of recycling such as saving resources, or negatively framed, stressing the harmful consequences of not recycling such as landfill and pollution, and were delivered through one of three sources: a flyer in the style of an advertisement, a newspaper article, or a personal letter from the acquaintance. A control group received no message. Recycling behaviour was measured covertly by observing the number and variety of items placed out for kerbside collection the week before and the week after the message, and attitudes and beliefs about recycling were measured by a questionnaire administered after the behavioural observation. Lord found that every message condition increased recycling compared with the control group. Positively framed messages produced the most favourable beliefs and attitudes towards recycling, but the greatest increase in actual recycling behaviour came from the negatively framed message delivered in a personal letter from someone the resident knew. Personal communication was generally more effective than the advertisement or the newspaper article.

The study tells us several things about the factors that influence recycling behaviour. First, the source of a message matters: a personal appeal from an acquaintance has more impact on behaviour than impersonal media, probably because of social pressure and the credibility of a known source. Second, the framing of the message matters, but differently for attitudes and behaviour: positive messages make people feel good about recycling, whereas a negative,

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fear-based message from a personal source is more likely to actually change what people do. Third, the study shows that attitudes and behaviour are not the same thing, so campaigns that only improve attitudes may not increase recycling; the best approach is to combine a personal source with a message that highlights the consequences of not recycling. Finally, because all messages increased recycling, it shows that simple, cheap prompts can raise conservation behaviour, at least in the short term.

- 7(b) *Determinism is the view that behaviour is caused by factors outside the person's control, such as the environment, biology or past learning, so it can be predicted. Free will is the view that people make genuine choices and could have acted differently. Environmental psychology's research into conservation behaviour sits firmly within this debate because its aim is usually to find techniques that make people recycle or save energy, which assumes behaviour can be determined by changing the situation.*
- Much of the research supports environmental determinism. Lord (1994) showed that simply sending a persuasive message changed recycling behaviour, and that a negatively framed personal letter produced the biggest increase, implying that framing and source determine how much people recycle. Research on antecedent strategies such as prompts and social norms points the same way: Goldstein, Cialdini and Griskevicius (2008) found that hotel guests were more likely to reuse towels when a card said most previous guests in that room had done so, so a tiny change to the sign shifted behaviour. Consequent strategies such as bottle deposit schemes and feedback on energy use also increase conservation, suggesting behaviour is shaped by its rewards in line with operant conditioning. A strength of this deterministic approach is that it produces practical, testable interventions that councils can use, and it is scientific because cause and effect can be demonstrated in field experiments.*
- However, none of these interventions make everyone behave in the same way. In Lord's study the messages raised the average level of recycling, but many households did not change and some in the control group recycled anyway, and the increases were modest. If behaviour were*

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fully determined by the message, every household should have responded. This variation suggests individual choice, values and beliefs mediate the effect of the situation, which is evidence of free will, or at least of soft determinism, where situational factors make conservation more likely without compelling it. People can also resist manipulation, as shown by the gap Lord found between attitudes and behaviour: residents who held positive attitudes still chose not to recycle.

A further point is that the deterministic approach raises ethical concerns. Techniques such as fear-based messages and social norm nudges work partly without the person's awareness, so they can be seen as manipulation that bypasses free choice, even if the goal is good for the environment. On the other hand, treating conservation as a free choice means relying on education, which research suggests is much less effective than changing the situation, so a purely free-will approach may fail to protect the environment.

In conclusion, research into recycling and other conservation behaviours mostly adopts a deterministic stance and shows that situational factors reliably influence behaviour, but the incomplete and variable effects of these techniques show that people retain a degree of free will. The most accurate position is soft determinism: the environment constrains and nudges conservation behaviour, but individuals still make the final choice.

- 7(c) *A psychologist would advise Kai to use a persuasive message campaign based on Lord's (1994) research. Lord found that all persuasive messages increased recycling, but the greatest change in behaviour came from a negatively framed message delivered by someone the recipient knew personally. Kai should therefore avoid relying on generic council leaflets and instead recruit local people, such as members of residents' associations, school pupils and sports clubs, to deliver the message personally to neighbours, friends and family, for example by hand-written letters, door-step conversations or messages in local community groups. The message should be negatively framed, pointing out the consequences of waste, such as the fact that a running tap wastes about six litres of water a minute while brushing teeth, that a bath uses around*

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80 litres compared with 40 for a short shower, and that wasting water increases bills and the risk of hosepipe bans in dry summers. Because Lord also found positive messages produced the best attitudes, the campaign could include a positive follow-up stressing the benefits of saving water, so residents feel good about the change as well as being motivated to make it.

A second technique is to use antecedent prompts at the point of behaviour. Kai could supply free stickers for bathroom mirrors and taps saying "Turn me off while you brush" and shower timers, because prompts placed exactly where and when the behaviour occurs are most effective at triggering it. These could incorporate a descriptive social norm, such as "8 out of 10 households on your street now shower instead of bathing", following Goldstein et al.'s (2008) finding that norm-based messages increased towel reuse in hotels more than standard environmental appeals.

Finally, Kai could add a consequent strategy by giving feedback. Working with the water company, households could receive monthly reports comparing their usage with similar neighbours, with a smiley face for below-average use. Feedback acts as reinforcement and the comparison again uses social norms. Combining a personal negatively framed message, prompts at the tap and feedback gives Kai techniques that target behaviour before and after it occurs, which research suggests is more effective than any single approach.

8(a) Zajonc, Heingartner and Herman (1969) tested whether the presence of others facilitates or inhibits performance, using cockroaches so that the effect could be studied without human factors such as evaluation apprehension. In the first experiment 72 female cockroaches were placed in a clear Plexiglas apparatus with a bright light at the start box; because cockroaches avoid light, they were motivated to run to a darkened goal box. There were two tasks: a simple straight runway and a complex maze with several turns. Cockroaches ran either alone or in pairs (coaction), and each was given ten trials with the time to reach the goal recorded. In a second experiment the researchers added an audience condition, in which other cockroaches watched from Plexiglas boxes alongside the runway or maze, with an alone condition as a

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control. The results showed that in the simple runway task cockroaches ran faster with others present, both coactors and audience, than alone, around 33 seconds in pairs compared with about 41 seconds alone. In the complex maze the opposite occurred: cockroaches took longer with others present, around 130 seconds in pairs compared with about 110 seconds alone, and the audience also slowed them. Zajonc concluded that the mere presence of others raises arousal or drive, which strengthens the dominant response. On a simple task the dominant response is correct, so performance improves (social facilitation), whereas on a complex task the dominant response is often wrong, so performance gets worse (social inhibition).

This research explains how an audience affects sports performance through drive theory. A crowd raises a performer's arousal, and whether this helps depends on the complexity of the skill and how well learned it is. For simple or well-practised skills, such as a sprinter running 100 metres or an elite footballer passing, the dominant response is correct, so a big crowd should facilitate performance, which is consistent with the home advantage effect. For complex, fine motor or newly learned skills, such as a gymnast's new routine or a novice taking a penalty, the increased arousal makes errors more likely, so an audience inhibits performance. The study also shows that the mere presence of others is enough to produce the effect, which is why even a silent audience or co-acting team-mates can change performance. Coaches should therefore ensure skills are over-learned until automatic before athletes perform in front of large crowds, so that the crowd's arousal works for them rather than against them.

8(b) For research to be scientific it should be based on objective, empirical observation, use controlled methods such as experiments so that cause and effect can be established, collect quantitative data, produce replicable findings and test theories that are falsifiable. The question is whether research into how audiences affect sports performance meets these criteria.

Much of it clearly does. Zajonc et al. (1969) used a highly controlled laboratory experiment with 72 cockroaches, manipulating task complexity and the presence of others while holding

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everything else constant, and measuring running time objectively in seconds. The design allowed cause and effect to be established and the study could be replicated exactly, which is a hallmark of science. The findings supported drive theory, a falsifiable prediction that arousal enhances the dominant response, and this was then tested with humans, for example Michaels et al. (1982) who found skilled pool players improved and poor players got worse when watched. The theory could have been proved wrong and was not, so this is scientific theory testing.

However, the scientific status of Zajonc's work can be questioned on validity grounds. Cockroaches running from a light are a long way from footballers in a stadium, so even though the method is objective, generalising to human sport involves a large inferential leap; a scientific finding is only useful if it is valid as well as reliable. Human research on audience effects has its own problems. Studies of home advantage, such as Schwartz and Barsky's (1977) analysis of thousands of professional baseball, football, hockey and basketball results, use objective archival data and large samples, which is scientific, but they are correlational and cannot separate the crowd from travel fatigue, familiarity with the venue or referee bias, so cause and effect cannot be established. Later work, such as Pollard's analyses, found home advantage varies by sport and era, suggesting the effect is not a fixed law.

A further issue is that key concepts such as arousal, anxiety and evaluation apprehension are not directly observable. They are measured through self-report questionnaires like the Competitive State Anxiety Inventory or inferred from performance, which introduces subjectivity and makes the constructs hard to falsify, since any result can be explained by saying arousal was too high or too low. Real sporting events also cannot be experimentally controlled, so researchers either lose control (field studies) or lose realism (laboratory studies of simple tasks).

On the other hand, sport provides unusually good conditions for science: performance is measured objectively in times, scores and distances, crowds vary naturally, and the recent period in which matches were played in empty stadiums gave a natural experiment that found

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a smaller home advantage without fans, which is objective evidence that the audience itself matters.

In conclusion, research into audience effects is scientific in its methods, using controlled experiments, objective measures and falsifiable theory, but the extrapolation from animals and laboratories to real sport and the reliance on unobservable concepts such as arousal mean its conclusions should be treated with more caution than those of the natural sciences.

- 8(c) A sports psychologist would explain to Ahmet that the team's better results in an empty stadium are consistent with drive theory and Zajonc et al.'s (1969) research: an audience raises arousal, which helps simple, automatic skills but harms complex ones or any skill a player feels anxious about. The strategy should therefore prepare the players to cope with the extra arousal when supporters return.*
- First, the psychologist would suggest gradual re-exposure to crowd conditions in training so the audience is not a shock on match day. Ahmet could play recorded crowd noise through the stadium speakers during practice matches, invite staff, families and local fans to watch training, and arrange a behind-closed-doors friendly with a small invited crowd before the first match. This is a form of systematic desensitisation and simulation training, so the players' arousal response to a crowd is reduced through habituation.*
- Second, Ahmet should over-learn the key skills. According to drive theory, arousal strengthens the dominant response, so if passing patterns, set pieces and penalties are drilled until they are automatic, the crowd's arousal will facilitate rather than inhibit them. Training in the week before the match should repeat well-rehearsed routines rather than introducing new tactics.*
- Third, the psychologist would teach anxiety-control techniques. Players can learn diaphragmatic breathing and progressive muscular relaxation to lower physiological arousal when they notice their heart rate rising, and use pre-performance routines before free kicks or throw-ins to focus attention on the task instead of the fans. Imagery can also be used, with players visualising performing well in front of a full, noisy stand so that it feels familiar.*

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Finally, the psychologist would use cognitive restructuring. Players should be encouraged to reinterpret the crowd's noise and their own arousal as excitement and support that gives them energy, rather than pressure, and Ahmet could remind them that home crowds normally produce a home advantage. Together these strategies prepare the players physically, technically and mentally so that the return of supporters maintains, rather than undermines, their good standard of performance.