



Oxford Cambridge and RSA

A Level Psychology

H567/03 Applied psychology

Thursday 22 June 2017 – Afternoon

Time allowed: 2 hours



You must have:

- the OCR 12-page Answer Booklet (OCR12 sent with general stationery)

INSTRUCTIONS

- Use black ink.
- Section A: Answer **all** the questions in this section.
- Section B: Choose **two** options and answer **all** parts of the question in the options you have chosen.
- Write your answers in the Answer Booklet. The question number(s) must be clearly shown.
- Do **not** write in the barcodes.

INFORMATION

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

SECTION A: Issues in mental health

Answer **all** the questions.

- 1 (a) Outline how mental hospitals failed to detect sanity in the research by Rosenhan (1973). [2]
- (b) Discuss ethical considerations of the research by Rosenhan (1973). [6]
- 2 Richard and Wendy are parents. They have just been told that their son has a psychotic disorder. They don't understand what this means.
- How might a clinical psychologist explain to Richard and Wendy the characteristics of a psychotic disorder? [6]
- 3 (a) Outline a biological treatment of **one** specific disorder. [5]
- (b) Discuss **one** strength and **one** weakness of the biological treatment referred to in your answer to question 3(a). [6]
- 4* To what extent are alternatives to the medical model of explaining mental illness scientific? [10]

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)* Explain how the research by Wood et al. (1976) could be used by teachers to help children solve problems. [10]

- (b)* Discuss the nature-nurture debate in relation to research into cognitive development and education. [15]

- (c)* Carl is a student in the sixth-form. He has been invited to talk to pupils in year 11 (aged 15–16 years) about the best ways to revise for their exams.

What suggestions might a psychologist make to Carl about strategies pupils can use to revise effectively for exams? [10]

OPTION 2**Criminal psychology**

- 6 (a)* Using the research by Raine et al. (1997), outline how criminal behaviour could be explained through physiological factors. [10]

- (b)* Discuss methodological issues involved when researching what makes a criminal. [15]

- (c)* Shanaz is a police officer who works with 'problem families'. Her job is to try and prevent members of these families from engaging in criminal behaviour in the future.

What suggestions might a psychologist make to Shanaz about biological strategies to prevent criminal behaviour in the families she works with? [10]

OPTION 3**Environmental psychology**

7 (a)* Explain how the research by Lord (1994) could be used to improve levels of recycling. [10]

(b)* Discuss the individual-situational explanations debate in relation to recycling and other conservation behaviours. [15]

(c)* Trevor is a teacher in a primary school. The children in the school are aged from 4–11 years. Trevor is responsible for increasing recycling and other conservation behaviours among the children in the school.

What suggestions might a psychologist make to Trevor about techniques for increasing recycling or other conservation behaviours among the children in the school? [10]

OPTION 4**Sport and exercise psychology**

8 (a)* Using the research by Zajonc et al. (1969), explain how sporting performance could be influenced by audiences. [10]

(b)* Discuss the validity of research into audience effects. [15]

(c)* Lizzie is a football player. She is about to play a football match in front of a large crowd for the first time.

What advice might a sports psychologist give Lizzie about how to prepare for this match? [10]

END OF QUESTION PAPER

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Candidate name: *StemUp Model Solution*

1(a) In Rosenhan's first study all eight pseudopatients, who were sane and only reported hearing an unfamiliar voice saying "empty", "hollow" and "thud", were admitted to all twelve hospitals they approached, eleven with a diagnosis of schizophrenia and one with manic-depressive psychosis. Once inside they behaved normally yet staff never detected their sanity: they stayed between 7 and 52 days (an average of 19) and were discharged with the label "schizophrenia in remission", even though 35 of the 118 real patients had suspected they were not genuinely ill.

1(b) Rosenhan's research raises several ethical concerns, although some aspects can be defended. In the first study the hospital staff were deceived: they were not told that the pseudopatients were healthy researchers reporting a fabricated symptom, so they could not give informed consent and were unable to withdraw. The hospitals were also publicly embarrassed when the results were published, which damaged the professional reputations of psychiatrists who had acted in good faith, and the real patients on the wards were observed and had their treatment recorded without their knowledge, which breaches their privacy and confidentiality. The pseudopatients themselves were placed at risk of harm; they were given over 2100 pills, witnessed abuse of patients and were held for up to 52 days, and because they had voluntarily admitted themselves they could only leave by convincing staff they were sane, so their right to withdraw was limited in practice.

On the other hand, Rosenhan can be seen as acting with integrity. The pseudopatients used false names and occupations so that no genuine records would follow them, no data was gathered that identified individual staff or patients, and in the second study the hospital gave consent to take part knowing that pseudopatients might present themselves over the following three months, so no deception occurred there. Rosenhan also argued that the deception was necessary because staff who knew they were being tested would have behaved differently, and the research is socially sensitive but ultimately beneficial because it exposed the depersonalisation and powerlessness experienced by patients and prompted reform of psychiatric diagnosis. Overall the study clearly broke guidelines on consent and deception in study one, but a cost-benefit analysis suggests the benefits to future patients largely justified the costs.

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- 2 A clinical psychologist would first reassure Richard and Wendy that a psychotic disorder, such as schizophrenia, is a recognised mental illness in which the person loses contact with reality for periods of time, so their son may experience the world very differently from them and this is not his fault or theirs. The psychologist would explain that the symptoms fall into two groups. Positive symptoms are experiences that are added to normal functioning. Their son may have hallucinations, most commonly hearing voices that nobody else can hear, which may comment on him or give him instructions. He may hold delusions, which are fixed false beliefs that he cannot be argued out of, for example that he is being followed or that his thoughts are being controlled, and his speech may be disorganised so that he jumps between unrelated ideas or is hard to follow. His behaviour may also appear disorganised or agitated, or at the other extreme he may show catatonic behaviour, remaining still and unresponsive. Negative symptoms are normal functions that are reduced or lost. Richard and Wendy may notice that their son has a flat emotional expression (affective flattening), speaks very little (alogia), loses motivation to start or finish tasks such as washing or working (avolition) and withdraws socially, taking little pleasure in things he used to enjoy. The psychologist would explain that under DSM-5 at least two of these symptoms, including one of delusions, hallucinations or disorganised speech, must be present for a significant part of a month, with signs of disturbance lasting six months and a clear drop in functioning at work or in relationships. Finally they would explain that the disorder tends to occur in episodes, that their son may not recognise he is ill during an episode, and that with antipsychotic medication and family support many people manage the condition well.
- 3(a) A biological treatment for obsessive-compulsive disorder (OCD) is drug therapy with selective serotonin reuptake inhibitors (SSRIs) such as fluoxetine, sertraline or fluvoxamine. OCD is linked to low levels of the neurotransmitter serotonin in the brain circuits connecting the orbitofrontal cortex and the basal ganglia. Normally serotonin released into the synapse is reabsorbed by the presynaptic neuron through reuptake transporters. SSRIs block these transporters, so serotonin remains in the synaptic gap for longer and continues to stimulate receptors on the postsynaptic neuron, increasing serotonin transmission and reducing the anxiety that drives obsessive

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thoughts and compulsive rituals. The drug is taken daily as a tablet, often at a higher dose than for depression (for example up to 60 mg of fluoxetine), and takes around six to twelve weeks before symptoms improve. Soomro et al. (2008) reviewed 17 randomised controlled trials with 3097 OCD patients and found SSRIs were significantly more effective than placebo in reducing symptoms measured on the Yale-Brown Obsessive Compulsive Scale, and SSRIs are usually continued for at least a year and combined with cognitive behavioural therapy.

- 3(b) One strength of SSRIs as a treatment for OCD is that there is strong scientific evidence for their effectiveness. Soomro et al. (2008) carried out a meta-analysis of 17 double-blind randomised controlled trials involving 3097 participants and found that every SSRI studied produced a greater reduction in Yale-Brown scores than placebo, with 6 to 13 week trials showing consistent benefits. Because these were controlled trials with placebo groups, the improvement can be attributed to the drug rather than expectation, so the treatment is evidence based. SSRIs are also cheap, widely available on prescription and require little effort from the patient compared with therapy, so they are a practical first step that can reduce anxiety enough for the person to engage in CBT.
- One weakness is that SSRIs treat the symptoms rather than the cause. They raise serotonin levels but do not address the faulty thinking or learned avoidance that maintains obsessions, so when the drug is withdrawn relapse rates are high and patients may need to stay on medication for years. They also produce side effects such as nausea, insomnia, headaches, reduced libido and, in young people, an increased risk of suicidal thoughts, which leads many patients to stop taking them. Soomro et al. themselves noted that most trials were short and funded by drug companies, so long-term effectiveness is uncertain and publication bias may inflate the apparent benefits. Overall SSRIs are an effective and convenient treatment but work best as part of a combined approach rather than a cure in themselves.

- 4 Science is usually judged by whether an explanation is based on objective, empirical evidence, whether it can be tested and falsified, whether its findings are replicable and whether it allows causal links to be established. The medical model meets many of these criteria through brain

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scans, genetics and drug trials, so the question is how far the behaviourist, cognitive, psychodynamic and humanistic alternatives match this standard.

The behaviourist explanation is the most scientific alternative. It argues that phobias and other disorders are learned through classical and operant conditioning, and this was demonstrated under controlled conditions by Watson and Rayner (1920), who conditioned Little Albert to fear a white rat by pairing it with a loud noise. The variables were observable and manipulated, so a causal link between the pairing and the fear response could be established, and the predictions are falsifiable and have been replicated in animal studies. Its scientific weakness is that it relies heavily on animal research and ignores internal processes, so it cannot explain disorders such as depression fully.

The cognitive explanation, for example Beck's negative triad or Ellis's ABC model, is partly scientific. It generates testable hypotheses, and studies using standardised questionnaires show that depressed people do display more negative automatic thoughts, while the success of CBT in controlled trials supports the idea that faulty cognitions matter. However cognitions cannot be directly observed and must be inferred from self-report, which is subjective and open to social desirability bias, and it is hard to establish whether negative thinking causes depression or is a symptom of it, so causation is unclear.

The psychodynamic explanation is the least scientific. Freud's claims about unconscious conflict and repressed childhood trauma cannot be observed or measured, and because any evidence can be reinterpreted to fit the theory it is unfalsifiable, which Popper regarded as the defining feature of pseudoscience. The supporting evidence consists mainly of case studies such as Little Hans, which are subjective, unreplicable and interpreted by the therapist, so no causal link can be established. Humanistic explanations such as Rogers' idea of incongruence are similarly idiographic and deliberately reject objective measurement.

To conclude, the alternatives vary considerably: behaviourism approaches the rigour of the medical model, the cognitive approach is scientific in method but limited by its reliance on self-report, and psychodynamic and humanistic explanations are largely unscientific. A combined biopsychosocial approach may therefore be the most useful, but only some alternatives can claim to be scientific to any great extent.

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5(a) Wood, Bruner and Ross (1976) studied how a tutor helps young children solve a problem they could not manage alone. Thirty children aged three, four and five (ten in each group, half boys and half girls) were taught individually by the same tutor to build a pyramid from 21 interlocking wooden blocks, a task that was beyond any child alone. The tutor followed a standard approach: she let the child try, intervened only when they struggled, and gave the least help needed, moving from verbal prompts to showing the child if prompts failed. The researchers identified six scaffolding functions: recruitment (gaining the child's interest), reduction in degrees of freedom (simplifying the task), direction maintenance (keeping the child motivated and on task), marking critical features (pointing out what matters), frustration control and demonstration (modelling a solution). They found that three year olds needed mostly demonstration and recruitment because they ignored verbal instructions and often lost interest, four year olds responded well to verbal prompting and correction but needed showing when they went wrong, and five year olds could largely build the pyramid themselves and needed only confirmation and checking of their work.

Teachers can use this research in several ways. First, they should act as scaffolds, giving help that is contingent on how the child is doing rather than lecturing or leaving children to struggle, and gradually withdrawing support as competence grows so that the child does the final steps unaided. Second, the level of help should be matched to age and ability: with reception children a teacher should keep them on task and physically demonstrate how to solve part of a maths or construction problem, with slightly older children they should use verbal hints such as "what piece do you need next?" and correct errors, and with older or more able pupils they should simply check answers and confirm they are correct. Third, teachers should break complex problems into smaller steps (reducing degrees of freedom), highlight the critical features of a question, and manage frustration with encouragement so that children persist. In this way Wood et al.'s findings help teachers support problem solving within the child's zone of proximal development without doing the work for them.

5(b) The nature-nurture debate asks whether cognitive development is driven mainly by innate,

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biologically programmed maturation (nature) or by experience, culture and teaching (nurture).

In relation to education, this determines whether teachers should wait for children to be ready or actively drive development forward.

Piaget's theory leans towards nature. He argued that all children pass through the same four stages (sensorimotor, pre-operational, concrete operational and formal operational) at roughly the same ages because the stages are driven by biological maturation of the brain. Evidence such as the conservation and three mountains tasks showed that children below about seven consistently fail to decentre, suggesting an innate timetable. This has shaped education through readiness: teachers should provide discovery learning and not try to teach abstract concepts before the child is biologically capable. However Piaget also accepted a role for nurture, as schemas develop through assimilation and accommodation of experience, so his theory is really interactionist. Moreover his evidence is weak: his samples were small and biased towards his own children, and later work by Donaldson and McGarrigle showed that children succeed on conservation tasks when the question makes human sense, implying that performance depends on language and social experience rather than just maturation.

Vygotsky and Bruner support the nurture side. Vygotsky argued that cognitive development is a social process in which a more knowledgeable other guides the child through the zone of proximal development, and that language and culture shape thought. Bruner built on this with the idea of scaffolding and the spiral curriculum, arguing that any subject can be taught to any child in some honest form. Wood, Bruner and Ross (1976) provided empirical support: with contingent tutoring, three, four and five year olds built a 21 block pyramid they could not have built alone, showing that what children can achieve depends on the quality of instruction, not just their age. This has been highly influential in education, encouraging group work, peer tutoring and structured teacher support. Yet Wood et al. also found that the type of help needed varied systematically with age, which implies underlying maturational differences, so the study does not rule out nature. Its sample of 30 middle-class American children in an artificial lab task also limits generalisation.

Biological research adds weight to nature. Van Leeuwen et al. (2008) found that intelligence in 112 Dutch twin families was strongly heritable (about 67 percent), and brain imaging shows

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that the prefrontal cortex matures into adolescence, which may set limits on abstract reasoning regardless of teaching. However heritability figures also show that around a third of the variance is environmental, and Perry's work on severely neglected children shows that a lack of stimulation produces measurably smaller brains and developmental delay, demonstrating that nurture is necessary for genetic potential to be expressed.

In conclusion, the research suggests that neither position alone is adequate. Maturation sets the pace and constraints on development, but social interaction and teaching determine how far each child progresses within those limits. The most useful position for education is therefore interactionist: teachers should be sensitive to developmental readiness while actively scaffolding learning, as Wood et al. recommend. The debate also has methodological limits, because it is almost impossible to separate genes from environment in real children, so claims for either extreme should be treated cautiously.

5(c) A psychologist would advise Carl to tell the Year 11 pupils that effective revision depends on processing information deeply and retrieving it actively, not on simply rereading notes.

First, Carl should explain the levels of processing theory of Craik and Lockhart (1972). Craik and Tulving (1975) found that words processed semantically (for meaning) were remembered far better than words processed by sound or appearance. Pupils should therefore revise by explaining ideas in their own words, writing their own exam questions, teaching a topic to a friend or linking facts to real examples, rather than copying out notes or highlighting, which only produce shallow processing.

Second, Carl could recommend mnemonic techniques. The method of loci involves imagining a familiar route, such as the walk from home to school, and placing each item to be remembered at a point along it, then mentally walking the route in the exam; this works because it uses visual imagery and organisation, which are powerful retrieval cues. Acronyms and rhymes can be used for lists, such as the order of the planets, and chunking (Miller, 1956) can be used to group formulae or dates into meaningful units.

Third, Carl should stress the testing effect. Roediger and Karpicke (2006) found that students who tested themselves remembered far more a week later than students who spent the same

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time rereading, so pupils should use flashcards, past papers and quizzes and should space these sessions out over weeks rather than cramming the night before, because spaced practice produces more durable memories than massed practice.

Fourth, context and state can be used as cues. Godden and Baddeley (1975) showed that recall is better when the learning and recall environments match, so pupils should sometimes revise in quiet, exam-like conditions, and Carl might suggest practising past papers in silence under timed conditions. He could also recommend dual coding by turning text into diagrams or mind maps, so that information is stored both verbally and visually. Finally he should remind pupils about sleep and short breaks, because consolidation of memory occurs during sleep and attention declines after about forty minutes of study.

- 6(a) Raine, Buchsbaum and LaCasse (1997) investigated whether murderers who had pleaded not guilty by reason of insanity (NGRI) show different patterns of brain activity from non-murderers. The sample was 41 murderers (39 men and 2 women, mean age 34.3) from California, charged with murder or manslaughter and referred for scanning to obtain evidence of diminished responsibility; they had schizophrenia, head injury, substance abuse, epilepsy or learning disability. They were matched one to one by age and sex with 41 controls, including six schizophrenics matched with the six schizophrenic murderers, and were medication free for two weeks. Each participant was injected with a radioactive glucose tracer (fluorodeoxyglucose) and completed a continuous performance task for 32 minutes before a PET scan measured glucose metabolism in cortical and subcortical regions. The murderers showed significantly lower activity in the prefrontal cortex, the left angular gyrus and the corpus callosum, and abnormal asymmetries in the limbic system: reduced activity in the left amygdala, hippocampus and thalamus with greater activity on the right. There were no differences in areas such as the caudate, putamen or cerebellum, and no differences in task performance.
- These findings suggest that criminal behaviour could be explained physiologically. The prefrontal cortex is responsible for planning, self-control and inhibiting impulses, so reduced activity could lead to impulsivity, loss of self-control, poor decision making and an inability to foresee consequences, all of which make violent behaviour more likely. The amygdala and hippocampus

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are involved in processing emotion and fear, so abnormal activity could mean that a person does not learn from punishment or feel fear of consequences and may misread social cues as threatening. The corpus callosum links the two hemispheres, so poor transfer may leave the right hemisphere's emotional responses unregulated by the left hemisphere's language and reasoning. The angular gyrus is linked to verbal ability, and poor verbal skills are associated with school failure and crime. However Raine himself stressed that the data show a correlation not a cause: brain dysfunction does not make someone a murderer, as the abnormalities may themselves result from head injury or environment, and the findings apply only to a specific group of violent offenders, so physiology can only partly explain crime.

6(b) Researching what makes a criminal raises many methodological issues, because the causes of crime are hidden, complex and ethically sensitive, so the validity, reliability and generalisability of evidence are constantly under question.

A first issue is sampling and population validity. Raine et al. (1997) scanned 41 murderers who had pleaded not guilty by reason of insanity, most of whom had schizophrenia, head injury or substance abuse. This is a highly unusual group, so the reduced prefrontal activity found cannot be generalised to burglars, fraudsters or murderers who were found sane, let alone to all criminals. Similarly Lombroso's atavistic form theory was based on measuring the skulls of around 4000 convicted Italian criminals, many of them Sicilian, with no non-criminal control group, so his conclusion that criminals have physical features such as sloping brows is worthless because he could not know whether non-criminals shared them. Research often relies on convicted offenders, who represent only those caught and sentenced, so samples are biased towards less skilled, poorer offenders, and criminality is confounded with imprisonment, which itself may alter brain activity and behaviour.

A second issue is establishing cause and effect. Most research into criminal causes is correlational or quasi-experimental because people cannot be randomly assigned to have brain damage, be adopted or be neglected. Raine's PET scan differences could be a cause of violence, a result of head injuries sustained during violent lives, or a result of drug use, so causation cannot be inferred. Twin and adoption studies, such as Christiansen's (1977) finding of 35

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percent concordance for criminality in male identical twins against 13 percent in fraternal twins, are affected by the fact that identical twins share more similar environments and are treated more alike, so they cannot cleanly separate nature from nurture. Longitudinal studies such as Farrington's Cambridge Study, which followed 411 London boys from age 8 to 48, can show that risk factors like poor parenting and family criminality predict later convictions, but still cannot prove they cause offending because unmeasured variables may be responsible.

A third issue is the validity of measuring criminality itself. Official conviction records underestimate crime and reflect police and court bias, whereas self-report questionnaires about offending, as used by Farrington alongside records, are vulnerable to social desirability bias and lying, as offenders may hide serious offences or exaggerate for bravado. Sutherland's differential association theory is difficult to test because the ratio of pro-criminal to anti-criminal attitudes a person has been exposed to cannot be measured objectively. Interpreting brain scans also involves inference: a PET scan shows glucose metabolism during a task, not the person's behaviour at the moment of a crime, raising construct validity issues.

Finally, ethical constraints create methodological compromises. Researchers cannot deliberately expose children to criminal role models, so they rely on naturally occurring differences, and labelling children as biologically at risk, as Raine's work could do, raises socially sensitive problems that limit what can be studied. Research must also be reliable, with standardised scanning procedures and matched controls as Raine did, but these controls reduce ecological validity.

In conclusion, research into what makes a criminal is methodologically limited by biased samples, correlational designs, problems measuring crime and ethical restrictions. The best approach is to triangulate evidence from brain imaging, longitudinal records and self-report so that the weaknesses of one method are offset by another, while recognising that any single explanation is likely to be too reductionist.

6(c) A psychologist would advise Shanaz that although biology does not determine criminality, several biological risk factors in families can be reduced through practical strategies.

First, she should promote good nutrition in the families. Gesch et al. (2002) gave young

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offenders in a British prison daily vitamin, mineral and omega-3 fatty acid supplements in a double-blind trial and found a 26 percent reduction in disciplinary offences and a 37 percent fall in violent incidents compared with a placebo group. Shanaz could therefore work with health visitors to provide dietary advice, encourage families to eat fish, fruit and vegetables and reduce sugary and processed foods, and arrange for children who are poorly nourished to receive supplements, because deficiencies in zinc, iron and omega-3 are linked to impulsivity and aggression.

Second, she should target prenatal and early risks. Alcohol in pregnancy can cause foetal alcohol syndrome, which damages the prefrontal cortex and is linked to poor impulse control, the kind of deficit Raine et al. (1997) found in murderers. Shanaz could refer pregnant mothers to alcohol and smoking cessation services. She should also check for lead exposure from old paint or pipes in poor housing, since childhood lead poisoning is correlated with later arrests, and arrange for the council to remove hazards.

Third, biological assessment can guide intervention. Children in these families who show hyperactivity, poor attention or conduct problems could be referred for assessment of ADHD, for which medication such as methylphenidate can reduce impulsivity, and for head injuries, which are common in violent families. Where adult men show high levels of aggression, anger management programmes can be informed by biological data such as heart rate monitoring, and in cases of sexual offending, drug treatments that reduce testosterone can lower reoffending.

Finally, Shanaz could encourage regular sleep routines and physical exercise for the children, as both lower stress hormones and improve prefrontal functioning, and she could explain to parents that reducing shouting and physical punishment lowers chronic cortisol levels in children, which otherwise disrupt brain development. These strategies are preventive, inexpensive and address the physiological roots of impulsive behaviour before it becomes criminal.

7(a) Lord (1994) carried out a field experiment to test which kinds of persuasive message most effectively increase household recycling. The sample was 140 households in a suburban area of a northeastern city in the United States that already had a kerbside recycling scheme. Households were randomly assigned to one of six message conditions created by crossing message frame

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(positively framed, stressing the benefits of recycling for the environment and community, versus negatively framed, stressing the harmful consequences of failing to recycle) with message source (an advertising flyer, a newspaper article, or a personal letter from an acquaintance). A control group received no message. Students delivered the messages, and recycling behaviour was measured objectively by observing the number and types of items each household put out for collection in the week before and the week after the message, while a questionnaire measured beliefs about recycling and attitudes towards it. Lord found that all message types increased recycling compared with the control, that positively framed messages produced the most favourable beliefs and attitudes, but that the greatest increase in actual recycling behaviour followed a negatively framed message delivered as a personal letter from an acquaintance. The advertisement was the least effective source.

This research can be used in several ways to improve recycling. First, councils should distinguish between changing attitudes and changing behaviour: if the aim is to build long-term goodwill towards a scheme, positive messages about the benefits are appropriate, but if the immediate aim is to get more items into the recycling bin, messages that warn about landfill, pollution and wasted resources are more effective. Second, the source matters more than the medium's reach; impersonal advertising had the smallest effect, so campaigns should use personal contact, such as letters or visits from neighbours, friends, volunteers or community champions, or peer-to-peer schemes in workplaces and schools, because people respond to someone they know. Third, Lord's method shows that effectiveness should be evaluated by observing behaviour, not just by surveying attitudes, since positive attitudes did not translate into the biggest behavioural change. Combining a negatively framed personal appeal with the convenient kerbside collection already in place would therefore be the most effective strategy.

7(b) The individual-situational debate asks whether behaviour is best explained by factors within the person, such as attitudes, values, knowledge and personality, or by features of the situation, such as prompts, rewards, convenience and social norms. Applied to recycling and other conservation behaviours, the debate determines whether interventions should try to change people or change their environment.

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There is strong support for situational explanations. Lord (1994) found that simply varying the message households received changed recycling behaviour, with a negatively framed personal letter producing the biggest increase, which shows that behaviour responds to external communication rather than stable dispositions. Antecedent strategies such as prompts work in the same way: Geller's research showed that signs placed at the point of behaviour increase recycling and reduce littering. Consequent strategies also support the situational view. Bottle deposit schemes in Germany and Scandinavia have produced return rates above 90 percent, and feedback such as Schultz et al.'s (2007) normative messages on energy bills, which told households how their use compared to neighbours, reduced consumption among high users. Goldstein, Cialdini and Griskevicius (2008) found that hotel guests were more likely to reuse towels when a card said most guests in that room had done so, showing that apparent social norms drive conservation. The strength of this position is that it is supported by field experiments with objective behavioural measures, so causal links can be drawn, and situational interventions are practical for policy makers.

However, situational explanations cannot explain everything. In every study, some people recycle without prompts and others ignore them, which points to individual differences. Lord found that positive appeals improved beliefs and attitudes, suggesting that attitudes are a real part of the picture, and in the hotel study a minority still did not reuse towels. Individual explanations centre on knowledge deficits (people who do not know what can be recycled contaminate bins), environmental values and concern, feelings of self-efficacy and personality traits such as conscientiousness. Research on the theory of planned behaviour shows that intentions predicted by attitudes and perceived control account for a moderate proportion of variance in recycling. Interventions based on education and values, such as school environmental programmes, can therefore produce more durable change than deposits, because once a reward is withdrawn behaviour often returns to baseline, as seen in the boomerang effect when feedback is removed. Nevertheless individual explanations have weaknesses too. Attitudes are measured by self-report, which is affected by social desirability, and the attitude-behaviour gap is well documented: many people express concern for the environment but do not act on it, which Lord's own finding that positive attitudes did not produce the largest behaviour change illustrates. This

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suggests that individual factors are necessary but not sufficient, and that situations determine whether dispositions are translated into action.

A more useful conclusion is interactionist. Schultz's feedback worked precisely because individual values (wanting to be normal) interacted with situational information, and Lord's personal letters worked because the source was personally meaningful to the individual. Behaviour is therefore best explained by the fit between the person and the situation; effective recycling programmes should make the desired behaviour convenient and normative while also building knowledge and personal commitment. The debate also reveals a methodological issue, since situational research tends to be experimental and individual research correlational, so the two sides are not directly comparable, and the behaviours studied are often short term, limiting conclusions about lasting change.

7(c) A psychologist would suggest that Trevor uses techniques that change what children actually do, rather than just what they say they believe, and that suit children aged 4 to 11.

First, antecedent strategies should make the behaviour easy and obvious. Recycling bins should be placed in every classroom and the dining hall next to the general waste bins, colour coded and labelled with simple pictures of what goes in them so that even non-readers can use them. Geller's work on prompts suggests signs placed exactly at the point of behaviour, such as "Turn me off" stickers by light switches and "Only one paper towel" signs above sinks, are effective, and these could be designed by the children themselves so that they feel ownership.

Second, Trevor should use consequent strategies based on operant conditioning. A token economy could reward classes with points or stickers each time monitors find the recycling bin correctly used or lights switched off, exchanged for a weekly reward such as extra playtime, since young children respond strongly to immediate reinforcement. Inter-class competitions with a trophy for the class that recycles the most or reduces energy use the most add social motivation, and the results should be displayed on a feedback chart in the entrance hall, because feedback shows children the effect of their actions and maintains behaviour, as Schultz et al. found with normative feedback.

Third, social learning should be exploited. Bandura showed that children imitate models they

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admire, so Trevor and other teachers should visibly recycle and turn off equipment, and older children in Year 6 could act as Eco Monitors or Energy Rangers who model and praise the behaviour for younger pupils, which also uses the finding from Lord (1994) that personal sources are more persuasive than impersonal ones.

Fourth, commitment techniques such as a whole-school pledge or an eco-code that each class signs and displays make children more likely to act consistently with their public promise.

Finally, lessons should give age-appropriate knowledge, such as sorting games for the youngest children and projects on landfill for older pupils, so that children know what to recycle, but the psychologist would stress that knowledge alone is not enough and must be paired with the prompts, rewards and feedback described above. Trevor should measure actual recycling weights and energy bills before and after so he can see which techniques work.

- 8(a) Zajonc, Heingartner and Herman (1969) tested social facilitation using cockroaches so that the effect of an audience could be studied without the complication of human evaluation or cognition. Seventy two female cockroaches were placed in a clear plastic apparatus with a bright light at the start as an aversive stimulus and a darkened goal box they were motivated to reach. Two tasks were used: a simple straight runway and a complex maze requiring a turn. Cockroaches ran either alone, in pairs (a co-action condition) or in the presence of an audience of other cockroaches housed in clear boxes along the side of the apparatus. In the simple runway task, cockroaches running with others or with an audience reached the goal faster than those running alone (around 33 seconds in pairs compared with about 41 seconds alone). In the complex maze the effect reversed: cockroaches running alone finished in about 110 seconds whereas those with co-actors took around 130 seconds and audiences also slowed them. Zajonc explained this using drive theory: the presence of others raises arousal, and arousal increases the likelihood of the dominant response. For a simple or well-learned task the dominant response is the correct one, so performance improves (social facilitation), but for a complex or new task the dominant response is often wrong, so performance deteriorates (social inhibition). Applied to sport, this explains how an audience could influence performance. A sprinter, weightlifter or swimmer performing a simple, highly practised skill in front of a crowd should

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benefit, because the extra arousal energises the dominant correct response, which is why athletes often set personal bests at major events. However an athlete performing a complex skill such as a gymnastics routine, a golf putt or a tennis serve, or a beginner who has not yet made a skill automatic, is likely to perform worse in front of spectators because arousal interferes with fine coordination and brings out errors. The co-action findings also suggest that competing alongside others, such as in a race, has a similar facilitating effect to spectators. Coaches should therefore ensure complex skills are over-learned until they become dominant responses before exposing athletes to large audiences, and should expect novices to under-perform in front of crowds. Although the research used cockroaches and so cannot capture evaluation apprehension in humans, Michaels et al. (1982) found the same pattern in pool players, with skilled players improving and poor players deteriorating when watched.

8(b) Validity refers to whether a study measures what it claims to measure and whether its findings can be generalised beyond the research setting. Research into audience effects spans animal experiments, laboratory studies and archival analyses of real sport, and each raises different validity issues.

Population validity is a major concern. Zajonc et al. (1969) demonstrated social facilitation and inhibition in cockroaches running a runway and a maze. The study was highly controlled and supports drive theory, but generalising from insects to human athletes is questionable because humans are aware of being evaluated and interpret crowds as supportive or hostile, so the mechanism may be entirely different. Human studies also suffer population problems, since early work such as Triplett's (1898) finding that children wound fishing reels faster in pairs used children on a simple motor task that bears little resemblance to elite sport. Michaels et al. (1982) improved on this by observing real pool players in a student union, finding that good players' shot accuracy rose from 71 to 80 percent when watched while poor players fell from 36 to 25 percent, but the players were American students in a bar, not athletes under competitive pressure.

Ecological validity is a related issue. Laboratory tasks such as mazes or reaction time tests lack the stakes, skill and emotion of a match, so the arousal produced by a few observers may not

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reflect that produced by 60 000 spectators. Archival studies of real sport have high ecological validity: Schwartz and Barsky (1977) analysed thousands of professional games and found a home advantage, especially in indoor sports such as basketball and ice hockey where crowds are closer and louder. However these studies lack control, as home advantage could be explained by travel fatigue, familiarity with the venue or referee bias, which Nevill et al. (2002) demonstrated by showing that referees watching with crowd noise gave fewer fouls against the home team. This means construct validity is threatened, because it is unclear whether the audience itself is the active variable.

Construct validity is also a problem in isolating which aspect of an audience matters. Cottrell (1968) found that a blindfolded audience did not produce facilitation whereas an attentive one did, suggesting that evaluation apprehension rather than mere presence is key, which contradicts Zajonc's cockroach data where evaluation is impossible. Baumeister and Steinhilber (1984) claimed home teams were more likely to choke in decisive World Series and NBA games because of self-consciousness, but Schlenker et al. (1995) reanalysed the data with more seasons and found the effect disappeared, showing that archival findings can be unreliable and sensitive to the sample of years chosen.

Finally, individual differences and measurement raise validity issues. Audience effects vary with personality, with introverts and highly anxious performers being more inhibited than extroverts, so a group average may be invalid for a given athlete. Studies that measure anxiety through self-report questionnaires such as the CSAI-2 risk social desirability bias, as athletes may be reluctant to admit fear of the crowd, and studies that rely on observers judging skill, as in Michaels et al., risk observer bias unless inter-rater reliability is established.

In conclusion, research into audience effects is valid in the sense that the basic pattern of facilitation of simple skills and inhibition of complex skills has been found across species, laboratory and field settings, which gives it concurrent validity. However no single study is fully valid: controlled experiments lack ecological and population validity, and real-world archival data lack control and construct validity. The most convincing evidence therefore comes from triangulating the different methods, and sports psychologists should apply general findings cautiously to individual athletes.

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8(c) A sports psychologist would advise Lizzie that playing in front of a large crowd for the first time will raise her arousal, and that the key is to manage this arousal so that it facilitates rather than inhibits her performance, as predicted by drive theory and the inverted U hypothesis.

First, the psychologist would advise her to make her core skills as automatic as possible before the match. According to Zajonc et al. (1969), arousal brings out the dominant response, so the more over-learned her passing, control and shooting are, the more likely the crowd will improve rather than impair them. She should practise under simulated pressure, for example training with recorded crowd noise, inviting spectators to training sessions or playing practice matches with consequences, so that the stimulus of noise and attention becomes familiar and less arousing.

Second, she should learn relaxation techniques to use before and during the game.

Diaphragmatic breathing, taking slow deep breaths from the stomach for a count of four in and six out, lowers heart rate and can be used in the tunnel and at breaks in play. Progressive muscle relaxation, tensing and releasing muscle groups in turn, can be practised in the days before so that she can recognise and release tension quickly. Biofeedback, where she monitors her heart rate while practising these techniques, would show her that she can control her physical arousal.

Third, the psychologist would recommend cognitive strategies. Lizzie should use imagery, vividly rehearsing herself walking out to the noise, hearing the crowd and performing skills successfully, which builds confidence and a feeling of familiarity. She should replace negative self-talk such as "everyone is watching me" with positive, instructional cue words such as "first touch" or "head up", and reframe her nerves as excitement that will give her energy. Cognitive restructuring, as in cognitive behavioural approaches, helps her challenge the belief that the crowd is judging her and focus on process goals she controls, such as her work rate and communication, rather than outcome goals like scoring.

Fourth, she should follow a consistent pre-performance routine, such as the same warm-up, music, kit order and a brief visualisation before kick-off, because routines give a sense of

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control and direct attention away from the spectators. Finally she should set realistic goals for this first match, aim to enjoy the atmosphere, and treat the crowd as a source of energy, remembering that home crowds can be an advantage. Together these strategies should keep her arousal in the optimal zone so the big crowd helps rather than hinders her.