



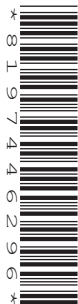
Oxford Cambridge and RSA

Thursday 16 June 2022 – 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 (a) Outline **one** similarity between two historical views of mental illness. [3]
 (b) Outline **one** difference between two historical views of mental illness. [3]
- 2 (a) Describe the characteristics of an anxiety disorder. [3]
 (b) Discuss the usefulness of knowing the characteristics of disorders. [5]
- 3 Alex is headteacher of a large secondary school. Alex is concerned that growing numbers of pupils at the school seem to be experiencing problems with their mental health.

How might a **cognitive psychologist** explain to Alex why the pupils may be experiencing mental health problems? [5]

- 4 In the key research by Gottesman et al. (2010), the following findings were reported for admissions to psychiatric care by the age of 52 years:

	Schizophrenia		Bipolar disorder	
	% of their children admitted	Number of couples	% of their children admitted	Number of couples
Both parents admitted with the disorder	27.3	196	24.95	83
One parent admitted with the disorder	7.0	8 006	4.4	11 995
Neither parent admitted with the disorder	0.86	1 080 030	0.48	1 080 030

- (a) Outline **two** conclusions that can be drawn from these findings. [4]
- (b) Outline **two** suggestions a psychologist might make about how these findings could be used. [4]
- (c) To what extent can these findings be considered reliable? [8]

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 what the key research by Johnson and Young (2002) tells us about the use of language, voice-overs and spoken lines in television adverts aimed at children. [10]
- (b)* Discuss the reductionism/holism debate in relation to research into the impact of advertising on children. [15]
- (c)* The Government is keen to limit the negative effects of advertising which is aimed at children. Outline at least one strategy a psychologist might suggest for how the Government could reduce the impact. [10]

OPTION 2

Criminal psychology

- 6 (a)* Describe the key research by Dixon et al. (2002) and explain what it contributes to our understanding of the psychology of the courtroom. [10]
- (b)* Discuss whether research into psychology and the courtroom is ethnocentric. [15]
- (c)* Sam works as a barrister. The client they are defending has been accused of causing criminal damage to property. Sam has a number of witnesses who can all testify that the client is innocent. Sam wants to know how to get the jury to believe the witnesses. Outline at least one strategy a psychologist might suggest for how Sam could get the jury to believe the witnesses. [10]

OPTION 3**Environmental psychology**

7 (a)* Explain what the key research by Czeisler et al. (1982) tells us about biological rhythms. [10]

(b)* Discuss sampling bias in research into biological rhythms. [15]

(c)* Azmi works as a member of cabin crew for an international airline that flies across different time zones. Azmi is scheduled to work a series of shifts that will mean having to stay awake when they would normally be asleep.

Outline at least one strategy for how Azmi can try to reduce the effects of shift work or jet lag upon them. [10]

OPTION 4**Sport and exercise psychology**

8 (a)* Use the key research by Fazez and Hardy (1988) to explain how a catastrophic drop-off in sporting performance can occur. [10]

(b)* Discuss the individual/situational explanations debate in relation to arousal and anxiety in sport. [15]

(c)* Taylor is the manager of a boxing club. Some members of the club are not performing as well in the boxing ring as Taylor believes they could. Taylor is concerned that the problem is being caused by their levels of arousal and anxiety.

Outline at least one technique a psychologist might suggest to Taylor for managing arousal and anxiety. [10]

END OF QUESTION PAPER

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Candidate name: *StemUp Model Solution*

1(a) *One similarity between the view that mental illness was caused by demonic possession and the humoral view put forward by Hippocrates is that both located the cause of the illness inside the person's body and both led to physical, highly invasive treatments. In the demonic view, evil spirits were believed to have entered the sufferer, so trepanning was used to drill a hole in the skull to release the spirit. In the humoral view, madness was thought to result from an excess of one of the four humours, such as too much black bile causing melancholia, so bloodletting and purging were used to drain the excess fluid. In both cases the patient, rather than their environment, was treated and the treatment was potentially harmful.*

1(b) *One difference between the demonic possession view of mental illness and the humoral view is that one was a supernatural or religious explanation whereas the other was an early natural, biological explanation. The demonic view, common in medieval Europe, saw strange behaviour such as hallucinations as evidence that the sufferer had been possessed by the devil or was a witch, so treatment was carried out by priests through exorcism or, in extreme cases, burning. The humoral view, from Hippocrates and the ancient Greeks, saw mental illness as an imbalance of blood, phlegm, yellow bile and black bile linked to the seasons and the elements, so it was treated by physicians through diet, bloodletting and lifestyle changes. One view therefore blamed external spiritual forces while the other blamed the body's own fluids, making the humoral view closer to modern medical thinking.*

2(a) *One anxiety disorder is a specific phobia, such as arachnophobia. Its first characteristic is an intense and persistent fear of a particular object or situation that is out of all proportion to the actual danger it poses, for example a person becoming terrified at the sight of a small house spider and being unable to reason their way out of this fear even though they know it is harmless. A second characteristic is avoidance, where the person goes to great lengths to avoid the feared object, such as refusing to go into a garden shed or checking a room before entering, and this avoidance interferes with their everyday life. A third characteristic is extreme physiological arousal when the object is encountered, including a racing heart, sweating, trembling and a panic response. For a diagnosis these symptoms usually have to be present for*

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at least six months.

2(b) Knowing the characteristics of disorders is very useful because it allows clinicians to make an accurate and consistent diagnosis. Classification systems such as the DSM-5 and ICD-11 list the characteristics of each disorder, for example the irrational fear and avoidance that define a phobia, so two different psychiatrists seeing the same patient are more likely to reach the same diagnosis. This improves the reliability of diagnosis and means the patient can be given the treatment that is known to work for that disorder, such as systematic desensitisation for a phobia or SSRIs and CBT for depression, rather than a treatment chosen by guesswork.

A second useful application is for the individual and their family. Knowing that their extreme, apparently strange experiences such as compulsive hand washing are the recognised characteristics of a disorder like OCD can be reassuring, reduces self blame and helps the person explain their needs to employers or schools so that reasonable adjustments can be made.

However, the usefulness is reduced if knowledge of characteristics leads to inaccurate self diagnosis, for example people reading symptom lists online and labelling normal nervousness as an anxiety disorder, or to people noticing symptoms they would not otherwise have noticed, which could actually increase their anxiety. Overall, though, knowledge of characteristics is useful because it is the foundation of reliable diagnosis and appropriate treatment.

3 A cognitive psychologist would explain to Alex that mental health problems arise not from events themselves but from the faulty, irrational ways in which people think about and interpret those events. Beck argued that depression develops from a negative cognitive triad of negative automatic thoughts about the self, the world and the future, maintained by cognitive distortions such as overgeneralisation and catastrophising, which stem from negative schemas formed earlier in life. Ellis's ABC model similarly states that an activating event (A) is interpreted through beliefs (B), and it is irrational beliefs, such as the demand that one must be perfect, that produce the unhealthy emotional consequence (C).

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Applied to Alex's school, the pupils may be facing GCSE and A level examinations and interpreting them in a catastrophic way, thinking that if they fail one test they are worthless and their whole future is ruined. This is an example of Beck's negative view of the self and the future. A second link is social media. Pupils who compare themselves to the carefully edited profiles of their peers may overgeneralise and conclude that everyone else is happier and more popular than they are, strengthening negative schemas about the self. Thirdly, pupils may hold the irrational belief, in Ellis's terms, that they must meet their parents' and teachers' expectations in every subject, so an ordinary setback at school becomes a source of anxiety and low mood. The cognitive psychologist would therefore tell Alex that the growing problems reflect how the pupils are thinking about these pressures, and that helping them challenge these thoughts through CBT would help.

4(a) One conclusion is that the more parents a child has who have been admitted with a disorder, the more likely the child is to be admitted with the same disorder, which suggests that both schizophrenia and bipolar disorder have a strong genetic or inherited component. This is supported by the fact that 27.3 per cent of children with two parents admitted for schizophrenia were themselves admitted, compared with 7.0 per cent with one parent and only 0.86 per cent with neither, and the same pattern of 24.95 per cent, 4.4 per cent and 0.48 per cent appears for bipolar disorder.

A second conclusion is that even when both parents have been admitted with a disorder, the majority of children, almost three quarters, are not admitted with it, which suggests that genes alone cannot be a complete explanation and that environmental factors and individual vulnerability must also play a part, or that some people with a genetic predisposition never become ill enough to be admitted to psychiatric care.

4(b) One suggestion is that the findings could be used to offer genetic counselling to couples where one or both partners have been admitted with schizophrenia or bipolar disorder. A psychologist

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could sensitively explain to such a couple that their child would have a raised risk, around one in four where both parents have the disorder, but also that around three quarters of children do not develop it, so that the couple can make an informed decision about having children without being pressured or stigmatised.

A second suggestion is that children of affected parents could be identified as a high risk group and offered early monitoring and support, such as regular check ups with mental health services, parenting support for the affected parents and psychoeducation so the family can recognise early symptoms. Because early intervention in psychosis improves outcomes, this could reduce the likelihood that a child who inherits the vulnerability is eventually admitted to psychiatric care. Both suggestions respect the socially sensitive nature of the data by supporting families rather than restricting their choices.

4(c) Reliability refers to the consistency of findings, so the question is whether Gottesman et al. would obtain the same pattern of results if the study were repeated, and whether the measurement of admissions was consistent across cases.

In several ways the findings can be considered highly reliable. First, the sample is enormous. The data came from Danish national registers covering over 2.7 million people, including 196 couples where both parents had schizophrenia, 8006 where one did and over a million where neither did. With samples this large, anomalous cases have very little influence on the percentages, so the trends of 27.3, 7.0 and 0.86 per cent are likely to be stable rather than a product of chance. Second, the same pattern emerges for two separate disorders. The risk falls from 24.95 to 4.4 to 0.48 per cent for bipolar disorder in exactly the same step like way as for schizophrenia, and this internal consistency suggests that the findings reflect a real, repeatable relationship rather than a one off. Third, because the study used an existing national database with standardised recording of admissions and ICD diagnoses, another researcher could reanalyse the same registers and should obtain identical figures, so the procedure is replicable in a way that an interview study would not be.

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However, there are reasons to question reliability. The admissions span several decades, and over this time Denmark changed from ICD-8 to ICD-10 diagnostic criteria, so the label schizophrenia may not have been applied consistently to every patient. Diagnosis also depends on the judgement of many different psychiatrists, so inter rater reliability cannot be guaranteed. Admission to psychiatric care is also a strict threshold, meaning that people with milder forms of the disorders were not counted, and if admission policies varied between hospitals or over time this would introduce inconsistency into the data. Finally, a study of over a million couples is extremely difficult to repeat with a fresh sample, so direct replication in another country has not really been possible.

Overall, the very large sample, the consistent pattern across both disorders and the use of a standardised register mean the findings can be considered reliable to a large extent, with the main doubts arising from possible inconsistency in diagnostic criteria over time.

5(a) Johnson and Young (2002) carried out a content analysis of 478 television adverts broadcast during children's programmes on American networks in 1996, 1997 and 1999. The adverts were categorised as boy oriented (188), girl oriented (138) or aimed at both or neither, and the researchers coded the gender of the voice over, the verb elements used, the speaking lines given to boys and girls, and the use of what they called power discourse.

The study tells us first that voice overs in children's adverts are strongly gendered. Every advert aimed at boys used a male voice over, 89 per cent of girl oriented adverts used a female voice over, and even adverts aimed at both sexes used mostly male voices. The male voice overs were typically loud, aggressive and exaggerated while the female voices were soft and sing song. This tells us that advertisers deliberately match the voice to the assumed audience and present the male voice as the default voice of authority.

Second, the language and verbs differ by gender. Boy oriented adverts used verbs of action,

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competition, destruction and control, such as crush, slam, smash and conquer, while girl oriented adverts used verbs about feelings, nurturing and limited activity, such as love, cuddle, care and share. The word power appeared 21 times in boy adverts and only twice in girl adverts, where it formed part of a toy's name. Even the names of toys reflected this, with harsh sounding names for boys' toys and soft, pretty names for girls' toys.

Third, in adverts aimed at both boys and girls, boys were given more speaking lines than girls and were shown as the active, dominant characters, so girls learn to take a secondary role.

Overall the study tells us that television adverts aimed at children use gendered discourse that reinforces traditional stereotypes of boys as powerful and active and girls as caring and passive. Johnson and Young suggest this happens because it has worked commercially in the past and because splitting the market in two sells more toys. According to social learning theory, children who watch these adverts repeatedly may imitate the roles modelled and so the adverts help to construct, not just reflect, gender identity.

5(b) Reductionism is the view that complex behaviour is best understood by breaking it down into its simplest component parts, such as a single variable or a biological mechanism, and studying these in isolation. Holism argues that behaviour can only be understood by looking at the whole person and the whole situation, because the interaction of many factors cannot be captured by any single part. Research into the impact of advertising on children can be placed at different points along this continuum.

The key research by Johnson and Young (2002) can be seen as relatively holistic. Rather than studying one feature of adverts, their content analysis of 478 adverts coded voice overs, verb elements, toy names, speaking lines and power discourse, and then considered how all of these combine to produce a gendered message. By analysing real adverts shown during children's programmes, they captured advertising as children actually experience it. The strength of this holistic approach is that it has high ecological validity and reveals how the different features

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work together to reinforce stereotypes, something a study of one variable would miss. However, even this study is reductionist in one important way. It focused only on the language of adverts and ignored visual features such as colour, setting, camera angle and music, which may be at least as influential on children, and it did not measure children's responses at all, so it cannot actually tell us what impact the adverts have.

Experimental research in this area is more clearly reductionist. Pine and Nash (2002) reduced the impact of advertising to a single measurable outcome, the number of branded items on children's letters to Father Christmas, and correlated this with hours of commercial television watched, finding a positive relationship for children who watched alone. Similarly, Lewis and Hill (1998) compared children's attitudes before and after viewing food adverts. The advantage of such reductionism is scientific. By isolating one variable, the researchers can establish cause and effect, measure the effect objectively and replicate the study, which is exactly the kind of evidence needed to persuade governments to regulate advertising. The disadvantage is that children do not watch adverts in a laboratory. In real life the impact of an advert depends on peer conversations, parental mediation, the child's existing gender schema and the programme surrounding the advert, so a reductionist study may underestimate or distort the true effect.

There is also a theoretical dimension. Social learning theory, often used to explain the impact of adverts, is somewhat reductionist because it explains behaviour through observation, imitation and vicarious reinforcement of models. Gender schema theory is more holistic because it considers how the child actively organises all the information available to them, including adverts, into a developing schema. A full explanation of the impact of advertising probably requires both, which suggests that an interactionist position is most useful.

In conclusion, research into the impact of advertising on children shows the trade off at the heart of this debate. Reductionist experiments give clear, testable evidence about specific effects, while more holistic content analyses like Johnson and Young's show how multiple features of adverts combine to send stereotyped messages, but neither alone captures the whole

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child in their whole environment. Both are needed, and the most convincing conclusions come from combining them.

5(c) One strategy the Government could adopt is to regulate the content of adverts aimed at children so that they cannot rely on gendered language and voices. Johnson and Young (2002) found that all boy oriented adverts used male voice overs and 89 per cent of girl oriented adverts used female voice overs, with boys' adverts using verbs of destruction and control and girls' adverts using verbs of nurturing. The Government could require the Advertising Standards Authority to enforce a code stating that toy adverts must use a mix of male and female voice overs, must show both boys and girls playing with the same toy and must give girls as many speaking lines as boys. According to social learning theory, children imitate same sex models they see rewarded, so if girls see girls playing with construction toys and boys see boys being caring, the stereotyped roles that adverts currently model would be weakened.

A second strategy is a time based ban or limit on advertising to children. The Government could ban adverts for toys and high fat, sugar and salt foods during and around programmes watched mainly by under twelves, in the way that Sweden and Quebec have restricted advertising to children. The rationale is Pine and Nash's (2002) finding that children who watched more commercial television, especially alone, requested more branded items in their letters to Father Christmas, while children in Sweden, where such advertising is banned, requested fewer. Reducing exposure therefore directly reduces the pester power effect and the stereotyped messages children receive, because under about eight years children cannot yet understand the persuasive intent of adverts.

A third strategy is to make media literacy a compulsory part of the primary curriculum. Lessons would teach children that adverts are made to sell things, how voice overs and language are chosen to target boys or girls and how to question the stereotypes shown. This draws on the cognitive idea that children who understand persuasive intent are less influenced by it, acting as a kind of inoculation. Combined with regulation of content and a limit on exposure, this would

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reduce the impact of advertising on children's behaviour and on their developing gender identity.

6(a) Dixon et al. (2002) investigated whether a suspect's regional accent affects judgements of guilt. The participants were 119 white undergraduate students from University College Worcester, none of whom came from Birmingham. They listened to a two minute recording of what they were told was a police interview between a British male inspector and a male suspect. The suspect was played by the same actor who used either a Birmingham (Brummie) accent or a standard, received pronunciation accent. Two further independent variables were manipulated through the inspector's words: the suspect's race (black or white) and the type of crime (a blue collar crime of armed robbery or a white collar crime of cheque fraud). Participants then rated the suspect's guilt on a seven point scale from innocent to guilty and completed the Speech Evaluation Instrument rating him on superiority, attractiveness and dynamism.

The results showed that the Brummie accented suspect was rated as significantly more guilty than the standard accented suspect, with the highest guilt ratings given when the suspect was Brummie, black and accused of the blue collar crime. Ratings of superiority and attractiveness also predicted guilt, so the less prestigious the accent sounded, the more guilty the suspect seemed.

This contributes to our understanding of the psychology of the courtroom in several ways. It shows that jurors' decisions can be influenced by a factor that has nothing to do with the evidence, since the words spoken were identical in every condition. It therefore demonstrates that jury decision making is a psychological rather than a purely legal process, open to stereotypes and the halo effect, and that these biases interact, so that a defendant with a non standard accent who is also from an ethnic minority is doubly disadvantaged. Although the study used a police interview rather than a trial, such recordings are often played as evidence in court, and defendants also speak when they give evidence, so the findings are relevant. The research also points to practical improvements, such as training jurors about accent bias, allowing defendants to give written statements, or lawyers coaching clients to speak in a more

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neutral way, in order to reduce discrimination in the courtroom.

6(b) Ethnocentrism is the tendency to view one's own culture as the norm and to judge or generalise about other groups from that standpoint. In research it occurs when studies are conducted in one culture, usually a Western one, with participants and materials from that culture, and the findings are then assumed to apply to all people. Research into psychology and the courtroom is open to this criticism for several reasons.

First, the samples used are narrow. Dixon et al. (2002) used 119 white undergraduates from University College Worcester and deliberately excluded anyone from Birmingham. The finding that a Brummie accent increases perceived guilt only makes sense within British culture, where regional accents carry particular status connotations. In another country a Birmingham accent would carry no meaning at all, and the particular accents that are stigmatised would differ. Similarly, Castellow et al. (1990) found that attractive defendants were less likely to be judged guilty of sexual harassment, but attractiveness itself is culturally defined, so what is attractive to American students may not be to a Nigerian or Japanese jury.

Second, the materials and procedures are culturally bound. Dixon's study manipulated race as black versus white, which reflects the ethnic categories salient in Britain and the United States but would be meaningless in a culture where those were not the main groups. Pennington and Hastie's (1988) work on story order relies on the Western adversarial trial, in which two sides present evidence to a lay jury. In inquisitorial systems such as France or Germany, where a judge investigates the case, and in many African and Asian societies where disputes are resolved by village elders or community moots, there is no jury to persuade, so the whole body of research on jury persuasion may not transfer.

Third, much courtroom research is conducted in the United States, which has unusual features such as jury selection by lawyers, televised trials and the death penalty. Loftus's work on expert witnesses and Cutler and Penrod's finding that jurors over rely on witness confidence come from

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mock American juries, and it cannot be assumed that juries in Britain, which cannot be questioned about their deliberations, behave in the same way.

However, the research can also be defended. Some findings may reflect universal cognitive processes. The halo effect, the use of stereotypes as heuristics and the tendency to process evidence as a story are features of human cognition that are likely to operate in any courtroom, even if the content of the stereotype differs. Dixon's finding is therefore ethnocentric in its detail but may be universal in its principle, namely that any non standard way of speaking is judged negatively by a dominant group. Furthermore, researchers such as Dixon were studying their own legal system in order to improve it, so the research is culturally specific by design rather than falsely claiming universality.

In conclusion, research into psychology and the courtroom is largely ethnocentric in its samples, its materials and its focus on the adversarial jury system, which limits how far its findings can be generalised. Nevertheless the underlying psychological mechanisms it reveals may well be universal, and the appropriate response is cross cultural replication rather than dismissing the research altogether.

6(c) One strategy a psychologist might suggest is that Sam presents the witnesses in story order rather than witness order. Pennington and Hastie (1988) found that mock jurors were far more likely to believe the side whose evidence was presented in the chronological order of events, with 78 per cent convicting when the prosecution used story order and the defence used witness order, but only 31 per cent when the pattern was reversed. Sam should therefore call the witnesses so that together they build a clear narrative of where the client was and what they were doing at the time the property was damaged, starting with the witness who saw the client earliest in the evening and ending with the one who saw them last. This helps the jury to construct a coherent story of innocence that fits their existing schemas, making it more believable than the prosecution's account.

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A second strategy is to maximise the witnesses' apparent credibility. Research by Penrod and Cutler (1995) showed that witness confidence was the single biggest influence on whether jurors believed an eyewitness, with 50 per cent of mock jurors convicting when the witness claimed 100 per cent confidence compared with 36 per cent when the witness was 80 per cent confident. Sam should prepare the witnesses so that they can give their evidence calmly, without hesitation and without phrases such as I think, while remaining truthful. Sam should also advise them to dress smartly, since Castellow et al. (1990) found that attractive, well presented people are judged more positively, and the halo effect means a smartly dressed, confident witness will be seen as more honest.

A third strategy relates to how the witnesses speak. Dixon et al. (2002) found that a speaker with a Birmingham accent was rated as more guilty and less credible than the same speaker with a standard accent. If any of Sam's witnesses have a strongly stigmatised regional accent, Sam could encourage them to speak clearly and in a more neutral register, and could establish each witness's credibility by asking about their occupation and relationship to the client before they describe what they saw, in line with the Yale model of persuasion, which shows that a credible source is more persuasive. Together these strategies give Sam the best chance of getting the jury to believe the witnesses.

7(a) Czeisler et al. (1982) studied the effect of applying circadian principles to rotating shift work at the Great Salt Lake Minerals and Chemicals Corporation in Ogden, Utah. The sample was 85 male shift workers who rotated between the night, evening and day shifts every week, in a phase advance direction, meaning that each change required them to go to bed earlier, and they were compared with 68 non rotating workers. Questionnaires found that the rotating workers complained far more of insomnia and of the schedule changing too often, and 29 per cent admitted falling asleep at work at least once in the previous three months. Czeisler then introduced a phase delay rotation in which workers moved from day to evening to night, so each change let them stay up later. One group changed every 7 days and another every 21 days. After nine months, workers preferred the 21 day phase delay schedule, health complaints and

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staff turnover fell and productivity, measured by the potash harvest, rose.

This tells us a great deal about biological rhythms. First, the circadian sleep wake cycle is controlled by an internal body clock, the suprachiasmatic nucleus, whose free running period in the absence of time cues is longer than 24 hours, around 25 hours at the time of the study. Because the clock naturally runs slow, it is much easier to delay the rhythm by staying up later than to advance it by going to bed earlier, which is why phase delay rotation was preferred and why the old phase advance schedule caused so many problems.

Second, the body can only shift its rhythm by about one to two hours a day, so sudden changes of eight hours cannot be accommodated and the worker ends up trying to sleep when their clock says it is daytime. Changing shifts weekly meant workers never adjusted before the next change, whereas 21 days gave the rhythm time to resynchronise. Third, disruption of circadian rhythms has real consequences for health, alertness and performance, since desynchronisation between the internal clock and external zeitgebers such as light and work schedules leads to insomnia and accidents. Finally, the study tells us that biological rhythms, although innate, can be managed by designing the environment around them, so understanding them has useful practical applications for shift workers and travellers.

7(b) Sampling bias occurs when the participants in a study are not representative of the wider population to which the researcher wishes to generalise, so that the findings may be true of the sample but not of people in general. It can arise from the sampling method, the size of the sample and the characteristics of the people, or animals, who take part. Research into biological rhythms shows several forms of this bias, although it can be argued that the biological nature of the topic makes the bias less serious than in other areas.

The key research by Czeisler et al. (1982) illustrates bias in terms of occupation and gender. All 85 rotating shift workers were men employed in one industrial plant in Utah. Their preference for a 21 day phase delay rotation may not generalise to nurses, pilots or air traffic

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controllers, whose work is cognitively demanding rather than physical, nor to women, whose circadian rhythms interact with the menstrual cycle and who often carry greater domestic responsibilities that affect when they can sleep. The workers were also volunteers from a company that wanted to improve productivity, so they may have been motivated to report satisfaction with the new schedule. Against this, the study had a reasonably large sample and a comparison group of 68 non rotating workers, and the improvements in objective measures such as turnover and potash output are harder to explain by sampling bias alone.

Much research into free running rhythms suffers from tiny samples. Siffre spent six months alone in a Texan cave in 1972 and found his cycle settled at around 25 hours and sometimes stretched to 48 hours. However, Siffre is a single, highly unusual man and his later cave study at the age of 60 showed his rhythm had slowed, so his results may reflect his age and personality rather than the human clock. Similarly, Folkard's study of Kate Aldcroft, who lived in a laboratory for 25 days without time cues, is a case study of one woman. Such samples are extremely biased and cannot tell us about variation between people, such as the difference between morning and evening chronotypes. Aschoff and Wever's bunker studies used more participants but still mainly young, healthy volunteers.

Research on non human animals raises a further form of bias. Ralph et al. (1990) transplanted the suprachiasmatic nucleus of mutant hamsters with a 20 hour cycle into normal hamsters, which then adopted the 20 hour rhythm, demonstrating that the SCN is the body clock. Hamsters are nocturnal and have a different lifestyle from humans, so what is true of one species may not be true of another. It can be argued, however, that the SCN and its genetic basis are highly conserved across mammals, so species bias is less of a problem here than it would be in research on social behaviour.

Indeed, a strong defence of research in this area is that circadian rhythms are governed by biological mechanisms that all humans share. If the pineal gland releases melatonin in response to darkness in one person, it almost certainly does so in everyone, so a small or

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unrepresentative sample may still give valid conclusions about the basic mechanism. Sampling bias matters more when the research question is about individual differences, such as how older people or shift working women cope with disruption, and it is here that the dominance of young male participants is a real limitation. Another concern is that most research has been carried out in Western industrialised societies, so cultural practices such as the siesta are underrepresented.

In conclusion, research into biological rhythms often relies on small, male, single occupation or non human samples, which limits how confidently findings about shift work, jet lag and free running cycles can be generalised. However, because the underlying rhythms are biological and universal, the consequences of sampling bias are less severe than in many other areas of psychology, and the findings have been broadly supported across different samples.

7(c) One strategy is for Azmi to use carefully timed exposure to bright light. Light is the most powerful zeitgeber, resetting the suprachiasmatic nucleus through the retinohypothalamic tract and suppressing melatonin release from the pineal gland. Boivin et al. (1996) showed that bright light could shift the circadian rhythm by several hours, with brighter light producing larger shifts. When Azmi has to stay awake during the hours when they would normally be asleep, they should work under bright cabin lighting or use a portable light box, and after landing in a new time zone they should seek daylight at the times of day appropriate to shifting the clock in the right direction, going outside in the morning after flying east and in the late afternoon after flying west. Equally, Azmi should wear dark glasses and use blackout blinds when they need to sleep at an unusual time so that light does not keep the clock anchored to the old zone.

A second strategy is to take melatonin supplements. Melatonin is the hormone that signals darkness and promotes sleep, and Herxheimer and Petrie's review found that taking a small dose at the local bedtime in the destination time zone significantly reduced jet lag symptoms in travellers crossing five or more time zones, particularly when travelling eastwards, which requires

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the body to fall asleep earlier than it wants to. Azmi could take melatonin at the target bedtime for the first few days of a new schedule to help their body clock resynchronise more quickly.

A third strategy follows directly from Czeisler et al. (1982), who found that the body clock naturally runs longer than 24 hours and can only shift by one to two hours a day, so phase delay changes are tolerated better than phase advances. Azmi should ask the airline to arrange their series of shifts so that each one starts later than the one before, rather than earlier, and to keep a given pattern for as long as possible rather than changing every few days. In the days before the shifts begin, Azmi could gradually move their bedtime later by an hour each night so that the body is partly adjusted before the first night shift. Combining light management, melatonin and gradual phase delay adjustment should considerably reduce the fatigue, insomnia and poor concentration that shift work and jet lag cause.

8(a) Fazey and Hardy (1988) published a monograph for the British Association of Sports Sciences called *The Inverted U Hypothesis: a catastrophe for sport psychology?* in which they challenged the traditional inverted U explanation of arousal and performance. The inverted U, based on Yerkes and Dodson, states that performance improves as arousal rises up to an optimal point and then declines gradually and symmetrically as arousal rises further. Fazey and Hardy argued that this did not match what coaches and athletes actually observe, since performance often does not decline smoothly but collapses suddenly, and once it has collapsed a small reduction in arousal does not bring it back.

Drawing on Thom's mathematical catastrophe theory, they proposed the cusp catastrophe model, which is three dimensional and includes two separate components of anxiety: physiological arousal, meaning the body's response such as heart rate and adrenaline, and cognitive anxiety, meaning worry and negative thoughts about performance. When cognitive anxiety is low, the relationship between physiological arousal and performance follows the ordinary inverted U. When cognitive anxiety is high, however, increasing physiological arousal improves performance

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up to a point and then produces a sudden, dramatic drop, the catastrophe. The model also describes hysteresis, meaning that to recover, the athlete must reduce their physiological arousal to a level well below the point at which the catastrophe occurred before performance returns to the upward curve.

This explains how a catastrophic drop off in sporting performance occurs. A golfer leading a major tournament on the final day may already be worrying about losing, so cognitive anxiety is high. As the pressure of the final holes increases physiological arousal, performance initially holds up, but once arousal passes the critical point the golfer suddenly loses the ability to execute even routine putts and the round falls apart, as happened to Greg Norman at the 1996 Masters. Taking a few deep breaths does not help because of hysteresis, so the collapse continues until arousal falls substantially, often only after the competition is lost. Hardy and Parfitt (1991) supported this with basketball players, whose free throw performance showed the catastrophic pattern on the day before an important match when cognitive anxiety was high, but a smooth inverted U on a neutral day. The model also implies that drop offs are more likely in complex or poorly learned skills and in athletes with low self confidence, so coaches should manage worry, not just physical arousal, to prevent them.

8(b) The individual/situational debate asks whether behaviour is best explained by factors within the person, such as personality traits, genetics and cognitive style, or by features of the situation they are in, such as the environment, the task and other people. Applied to arousal and anxiety in sport, the question is whether an athlete's anxiety and its effect on performance come from the kind of person they are or from the competitive situation they face.

Evidence for the situational side comes from research showing that the demands of the sporting situation determine the optimal level of arousal. Oxendine (1980) argued that gross motor tasks requiring strength and speed, such as weightlifting or tackling in rugby, benefit from high arousal, whereas fine motor tasks requiring precision, such as archery, golf putting or snooker, need low arousal. The same athlete can therefore perform well or badly depending

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purely on the task. Fazez and Hardy's (1988) catastrophe model is also partly situational because the catastrophic drop off occurs when the pressure of an important competition raises both cognitive anxiety and physiological arousal, and Hardy and Parfitt (1991) demonstrated this by comparing basketball players the day before an important match with a neutral day. Zajonc's drive theory of social facilitation adds that the presence of an audience raises arousal, helping well learned skills but harming complex ones. These findings suggest that if the situation changed, the anxiety would change too.

However, research on trait anxiety strongly supports the individual side. Spielberger (1966) distinguished trait anxiety, a stable personality disposition to perceive situations as threatening, from state anxiety, the temporary response to a particular situation. Martens et al. (1990) developed the Sport Competition Anxiety Test and the CSAI-2 and found that athletes high in trait anxiety consistently experience higher cognitive and somatic state anxiety before competition than low trait anxiety athletes in the same event. Hanin's Individual Zones of Optimal Functioning theory goes further by showing that each athlete has their own optimal anxiety level, with some performing best when quite anxious and others when calm, which cannot be explained by the situation alone. The catastrophe model itself contains individual variables, since Hardy argued that self confidence protects an athlete from catastrophe, and Jones et al. (1990) found that elite swimmers interpreted the same anxiety symptoms as facilitative while non elite swimmers saw them as debilitating.

Evaluating the debate, it is clear that neither side alone is adequate. Measurement research helps here: because the CSAI-2 measures state anxiety at a particular moment, it captures the interaction between the person's trait and the situation. The practical implications also differ. A purely situational view suggests coaches should change the environment, for example by simulating crowd noise in training, whereas an individual view suggests psychological skills such as self talk, imagery and relaxation should be tailored to each performer. In practice sport psychologists do both, which reflects an interactionist position.

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A further issue is that much of the research is correlational or uses self report questionnaires, which may be affected by athletes wanting to appear mentally tough, so the relative importance of individual and situational factors is hard to establish precisely. Nonetheless, the debate has been productive because it has forced researchers to move from simple inverted U models to multidimensional ones.

In conclusion, arousal and anxiety in sport are best explained by the interaction of a stable individual tendency, such as trait anxiety and confidence, with the specific demands and pressure of the sporting situation. Fazez and Hardy's model captures this well, since the catastrophe is produced when a particular kind of athlete meets a particular kind of situation, and the most useful explanations and interventions are those that take account of both sides.

8(c) One technique a psychologist might suggest to Taylor is progressive muscle relaxation combined with controlled breathing to manage the boxers' somatic anxiety. Fazez and Hardy's (1988) catastrophe model shows that when cognitive anxiety is high, excessive physiological arousal causes a sudden collapse in performance, and because of hysteresis the boxer must bring arousal well down before skill returns. Taylor could have the boxers learn Ost's applied relaxation, tensing and releasing each muscle group in training so that they can later relax on cue, and teach centring breathing, where the boxer exhales slowly and focuses attention on the centre of the body between rounds. In the corner during the one minute break, a few centring breaths would lower heart rate and muscle tension, keeping arousal below the catastrophic threshold so the boxer can keep their guard up and punch accurately rather than wildly.

A second technique is cognitive restructuring through positive self talk and imagery to control cognitive anxiety. Boxers who think I am going to get knocked out or I always freeze in big fights are raising the worry component that the catastrophe model identifies as dangerous. The psychologist could help each boxer identify these negative thoughts and replace them with instructional and positive statements such as hands up, move your feet, I have trained for this. Jones et al. (1990) found that elite athletes interpret pre competition nerves as facilitative, so

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Taylor could also teach the boxers to reframe butterflies as a sign that they are ready, which research shows improves performance. Mental imagery of entering the ring and executing combinations successfully would build the self confidence that Hardy argued protects against catastrophe.

A third technique addresses boxers who are under aroused rather than over anxious. Boxing is a gross motor sport which, according to Oxendine (1980), benefits from relatively high arousal, so some members may be flat and sluggish. Energising self talk, an up tempo pre fight music playlist and a consistent pre bout ritual of shadow boxing and pad work would raise arousal to the individual's optimal zone, as described by Hanin's Individual Zones of Optimal Functioning theory. The psychologist could first use the CSAI-2 questionnaire to measure each boxer's cognitive and somatic anxiety before sparring so that Taylor knows which members need calming and which need energising, and then match the technique to the boxer. Used together, these techniques would help the club members perform in the ring at the level Taylor believes they are capable of.